

# AGRICULTURAL CHEMICALS



*In This Issue :*

CHEMICAL CONTROL OF BRUSH ALONG THE RIGHT-OF-WAY • REPORTS OF TWO MAJOR FERTILIZER GROUP MEETINGS • PACIFIC SLOPE AAEE MEETING • LABOR SAVING IN HANDLING MATERIALS • PENNSYLVANIA HAS WEED DEMONSTRATION DAY • WESTERN SHADE TREE CONFERENCE MEETS IN CALIFORNIA • HOUSE FERTILIZER COMMITTEE FORESEES AMPLE NITROGEN FOR 1950 • PYRETHRUM SYNTHESIZED COMMERCIALY



**... part of the 2¢ per pound you save  
by using CELITE\* in your primary grinds**

**E**CONOMIES ALL ALONG THE LINE... savings that may amount to as much as 2¢ per pound on every pound of toxicant you grind... that's what the high absorption properties of Celite 400 can mean to you in cutting your production costs.

Here are three typical ways in which Celite 400 will help you save:

✓ **Reduced grinding costs:** Because of Celite's higher liquid absorption properties (more than twice its weight of water), you can grind up to 70% DDT mixtures. High concentrates of BHC and other low melting point poisons may also be ground with Celite.

✓ **Reduced packaging costs:** The higher strength primary grinds made possible by the use of Celite 400 enables the packaging of more toxicant per unit package.

✓ **Reduced storage and shipping costs:** These highly concentrated primary grinds produced by the use of Celite 400 ship and store more economically.

In addition to these savings, Celite 400, when used as the primary grinding aid, will impart greater kill power to the poison. Also, when used as the absorbing agent for liquid poisons, Celite 400 makes highly concentrated dry dusts at the lowest possible cost. For more information on the use of Celite 400, write Johns-Manville, Box 290, New York 16, N. Y.

**TYPICAL CELITE 400 PROPERTIES**

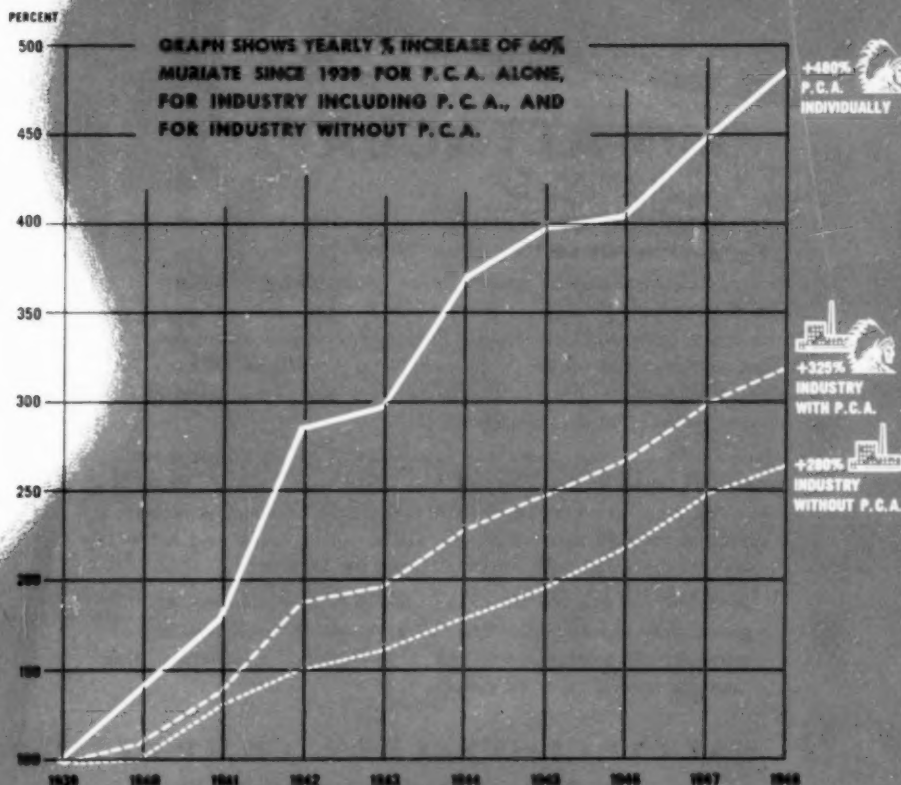
**Fineness:** 8% maximum on 325 mesh  
**Density (Vibrated):** 12.5 pounds per cubic foot  
**Bulk:** Celite bulks much higher than most diluents  
**Absorption:** 215% of its weight of water  
                   300% of its weight of kerosene  
**pH Value:** Below 7.0  
**Inertness:** Compatible with insecticide and fungicide poisons  
**Suspension:** Excellent in both air and water  
**Composition:** Celite is amorphous diatomaceous silica (SiO<sub>2</sub>)



\*Reg. U. S. Pat. Off.

**Johns-Manville CELITE 400**

# We've been doing some figuring...



1948 was a record year for domestic Potash. Using '39 as a base, the industry—not including P.C.A.—showed an increase of 280% in 60% Muriate. P.C.A. production lifts the industry increase to 325%. P.C.A. alone shows a High Grade Muriate increase for the same period of 480%.

95% of all P.C.A.'s '48 deliveries were in the form of 60% Muriate. Our new \$4,000,000 production and refining facilities now are operating. Our deliveries for '49-'50 will break all previous records. In fact, P.C.A.'s production capacity for 60% Muriate this year will exceed by some 150,000 tons the entire potash consumption—all grades—of the nation ten years ago.

These figures are graphic evidence of the leadership P.C.A. has won... leadership in volume, in economy to you and to agriculture.



## Potash Company of America Carlsbad, New Mexico

GENERAL SALES OFFICE... 50 Broadway, New York, N. Y. • MIDWESTERN SALES OFFICE... First National Bank Bldg., Peoria, Ill.  
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**Make your finished dusts well-conditioned . . .**

## **with ATTACLAY!**

By using Attaclay as extender or conditioner, finished dust blenders and their grower-customers both benefit.

Blenders take advantage of Attaclay's low bulk density to adjust the bulk of finished dusts. As a result, their whole line of crop dusts has a near-uniform volume. Packages and containers become standardized—mixing procedures streamlined. What's more, they work with a highly adsorptive, free-flowing material that eases many blending steps.

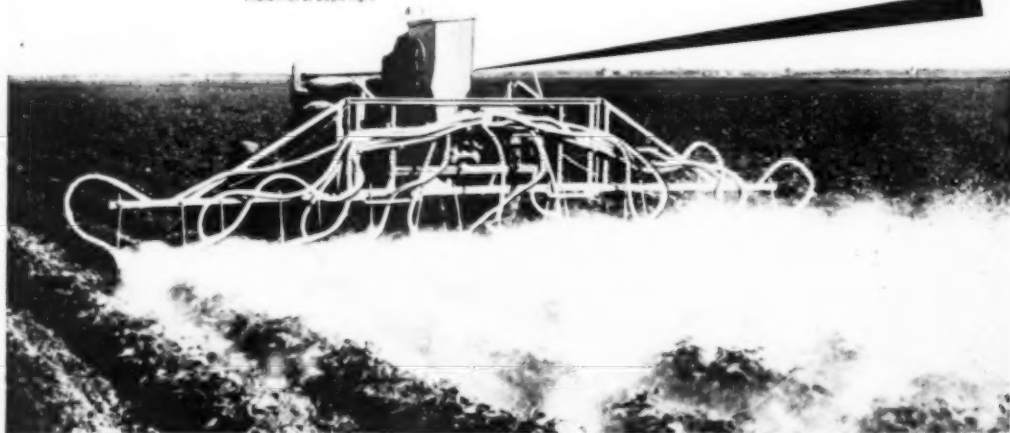
Growers benefit, too. They don't have to constantly adjust their rigs or speeds to compensate for "light" or "heavy" dusts. Besides, many growers know from experience how well Attaclay-mixed dusts will flow, disperse, settle, cover, stick and kill—how its lack of abrasiveness lengthens rig life.

Look into our diluent for *your* finished dust formulations. All the good points that make Attaclay so popular with concentrate makers will work equally well to *your* profit. A generous, free sample is yours for the asking.

### **ATTAPULGUS CLAY COMPANY**

Dept. P. 210 West Washington Square, Phila. 5, Pa.

Photo—U. S. Dept. Agr.





# AGRICULTURAL CHEMICALS



## THIS MONTH'S COVER

Fertilizer materials go to mixer,—weighed enroute,—in Hough Pay-loader at the Eastern States Farmers' Exchange, North Cambridge, Mass. and labor costs are cut. (Photo courtesy Frank G. Hough Co., Libertyville, Ill.)

JULY  
VOL. IV

1949  
No. 7

## A Monthly Magazine For the Trade

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*Associate Editor*

THOMAS MORGAN  
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## AGRICULTURAL CHEMICALS

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**Multiwall Performance**



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AGRICULTURAL CHEMICALS

## CONSERVATION...IRRIGATION...FERTILIZATION

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Of the fertilizers so widely used today, many of the most effective are compounded with potash—often with Sunshine State Potash, a product of New Mexico, and an outstanding soil nutrient that protects crops against plant diseases and drought, and provides greater soil fertility.

HIGRADE MURIATE OF POTASH 62/63%  $K_2O$   
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UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

JULY, 1949

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**GROWERS.** Your suppliers can easily supply you with effective dusts which won't involve you in controversial arguments about toxic residues. They need only use U.S.I.'s new **CPR Dust Base**. CPR contains pyrethrum and rotenone. And the equally safe piperonyl cyclonene has been included to provide an extra measure of effectiveness.

Dusts based on CPR control a *wider* variety of truck crop insects with effectiveness, economy and maximum safety.

**MANUFACTURERS.** CPR Dust Base is carefully standardized to insure uniform active ingredients in your finished dusts. And its physical properties permit easy blending with diluents.

Ask the nearest USI office for a copy of the new CPR Dust Base booklet. It includes detailed information on formulations of finished dusts, labeling and suggestions for use.

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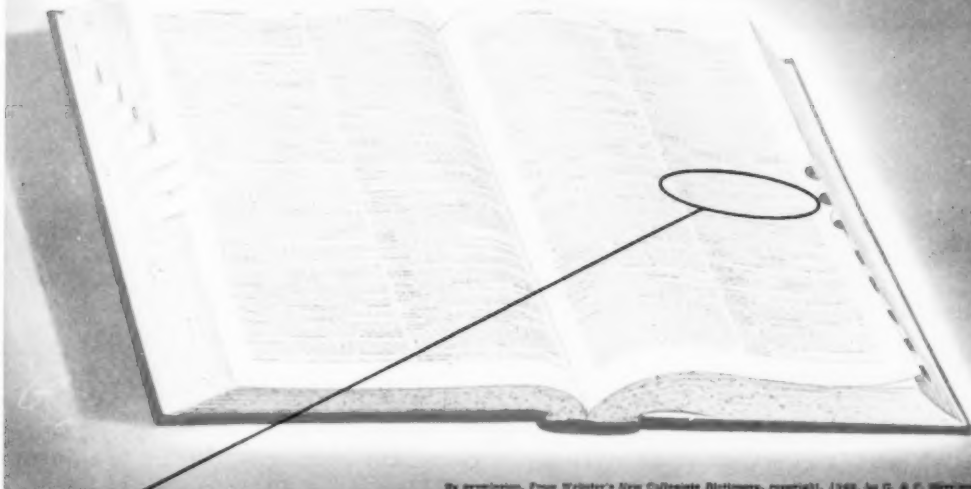
60 East 42nd Street, New York 17, N. Y.

*Branches in all principal cities*

**In Canada:** Standard Chemical Co., Ltd., 99 Vanderhoof Avenue, Leaside, Toronto 17, Ont.

# Why We Say

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Every Chemico-built plant is planned and designed to fit individual needs.

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Chemico takes full responsibility for the job...from initial investigation to completed project.

These are some of the reasons why owners have found that "*Chemico Plants are Profitable Investments.*"

Before deciding to build a new heavy chemical plant or remodel an old one, it will pay you to consult Chemico.

CC 106

### Typical Chemico Undertakings

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SYNTHETIC METHANOL  
DOUBLE SUPERPHOSPHATE  
AMMONIUM PHOSPHATE  
AMMONIUM SULFATE  
AMMONIUM NITRATE  
CALCIUM NITRATE  
FORMALIN

#### PLANTS FOR PRODUCTION, CONCENTRATION AND RECOVERY OF

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NITRIC ACID  
PHOSPHORIC ACID  
SULFURIC ACID

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*Chemico Plants are profitable investments.*



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May Exceed That of Any  
Previous Year in Last Decade!**

**TOXICHLOR\***  
CHLORDANE

**PHENACIDE**  
TOXAPHENE

**TRI-6\***  
B. H. C.

These Thompson-Hayward insecticides are the weapons to control this destruction menace. May be applied economically with weed sprayer, airplane or other types of application equipment. May be used as a bait, spray or dust.

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Remember to add these Thompson-Hayward products to your order: Ded-Weed\*, 2,4-D Weed Killer; Ded-Tox, DDT; Phosfume, Parathion.



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CHEMICAL COMPANY



\*Reg. U. S. Pat. Off.

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# SANTOBANE

## stops scourge of cornfields



How European corn  
borer infests cornstalks  
and destroys crop.  
*Photocourtesy U. S. D. A.*

Santobane (Monsanto's DDT) is an effective weapon against the invasion of the European corn borer, which has taken an annual toll of America's corn crop estimated to run as high as \$97,000,000.

Corn borer control with Santobane is achieved by ground spraying or dusting—using either ground rigs or airplanes. Spraying, considered most effective, is done at the rate of approximately 30 to 50 gallons per acre, using one pound of Santobane and one-third pound of Santomerse\* S (a wetting agent) in 100 gallons of water.

Ground dusting usually is done with 40 pounds of 5% Santobane to the acre and plane dusting with 20 pounds of 10% Santobane per acre.

Get set today to help your customers save their corn crops.

Santobane, technical DDT, is also available for prompt shipment as 90% and 50% dust concentrates. It is easy to formulate. Consult your local U.S.D.A. representative or county agent for latest recommendations. For further information and quotations, mail the coupon, contact the nearest Monsanto Sales Office or write: **MONSANTO CHEMICAL COMPANY, Desk G, Organic Chemicals Division, 1766 S. Second St., St. Louis 4, Mo.**

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SANTOCHLOR® (para-Dichlorobenzene)  
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TRICHLOROBENZENE, Technical  
NIFOS® T  
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For agricultural use only)  
NIRAN® (Parathion,  
For agricultural use only)

#### Monsanto Herbicidal Chemicals

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2,4-D ISOPROPYL ESTER  
2,4,5-T ACID  
2,4,5-T ISOPROPYL ESTER  
SANTOBRITE®  
(Sodium Pentachlorophenolate, Tech.)  
SANTOPHEN 20  
(Pentachlorophenol, Tech.)  
TRICHLOROACETIC ACID  
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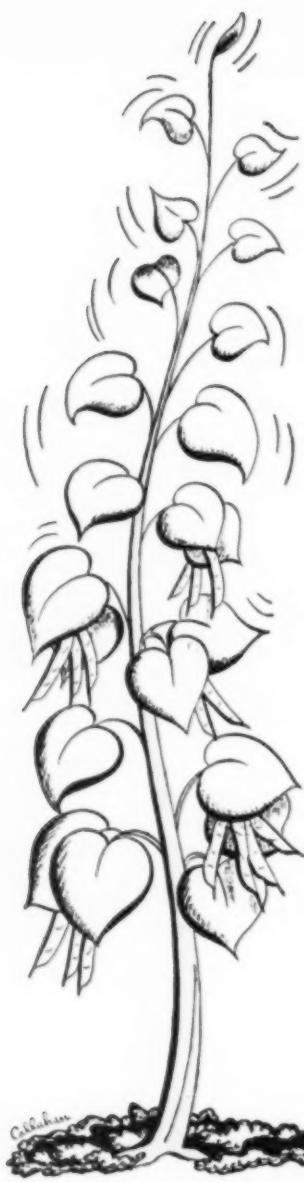
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Company

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***"JACK" is using***  
**SABADILLA**  
**ROTENONE**  
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**RYANIA**

***... all botanicals,***

***and he says  
his neighbors  
are doing  
the same!***

*Literature available on the above.*

**S. B. PENICK**

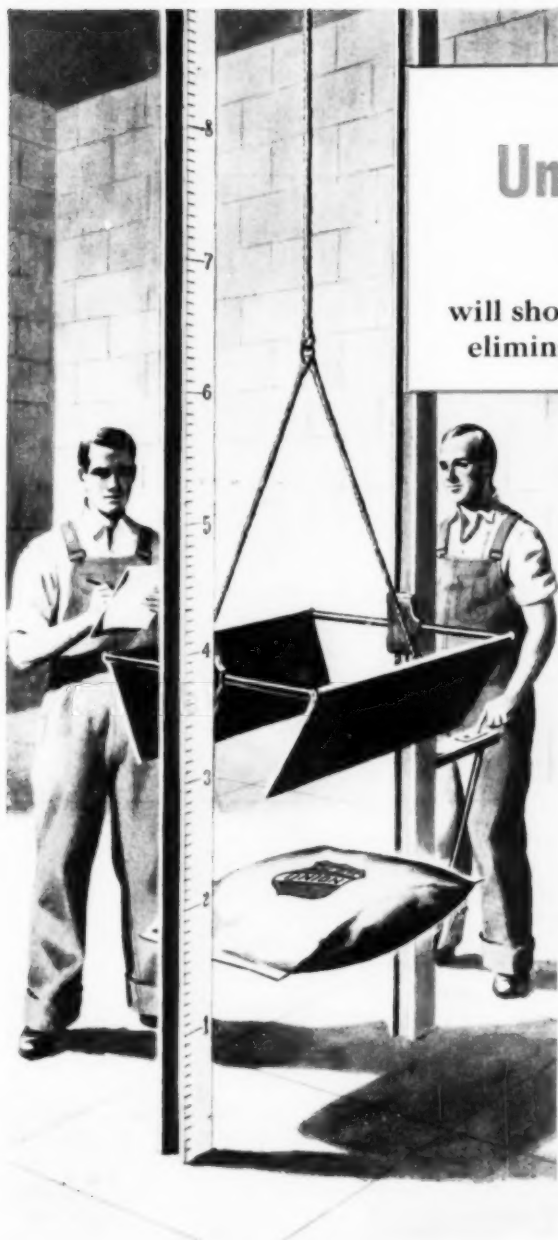
50 CHURCH STREET, NEW YORK 7, N. Y.  
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**& COMPANY**

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SHIPPERS of more than 300 different products find Union Multiwall Bags reduce customer complaints and losses in shipping and handling. They are custom-designed with reserve strength for hard knocks.

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Even if you are now using multiwall bags, your Union representative can give you new ideas on bag construction, packaging and handling that will save you money. So welcome him when he calls!



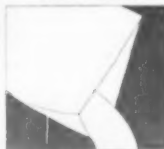
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Opens Easily



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**This Farmer  
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**Farmers don't always get results like this  
when they use fertilizers containing...**



You obviously couldn't promise your farm customers that when they use fertilizers containing *International Potash* they will grow corn as big as the gentleman from Iowa claims that he got.

You *can* assure them that by using quality plant foods they can expect to get large yields and fine quality in the growth of a wide variety of food and fiber crops.

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**POTASH DIVISION • INTERNATIONAL MINERALS & CHEMICAL**

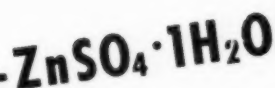


**CORPORATION**

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**AGRICULTURAL CHEMICALS**





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Top quality for Fertilizers and Orchard Sprays

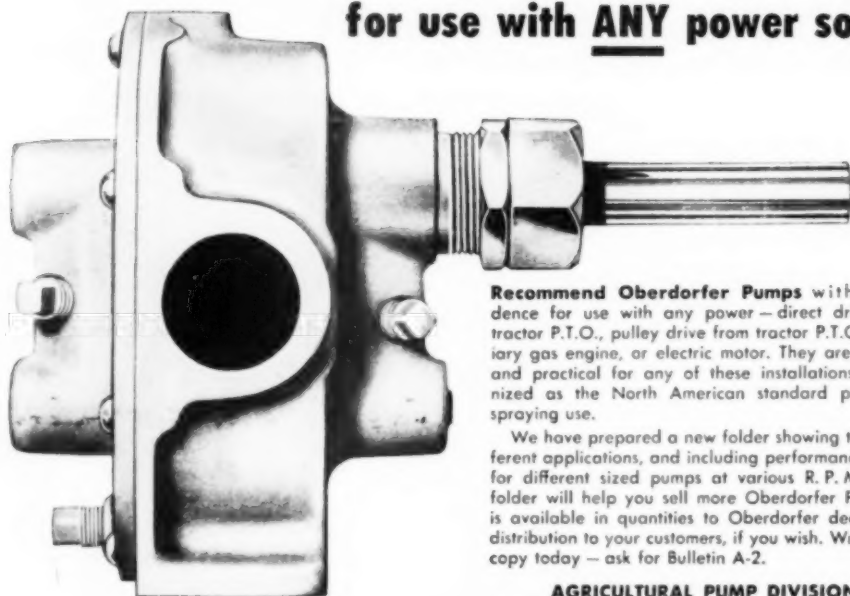
The new plant of Mancely Chemical Company at Wheatland, Pa., is one of the most efficient and modernly equipped chemical plants in the country.

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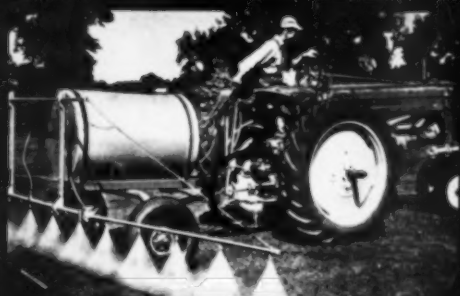
for use with ANY power source



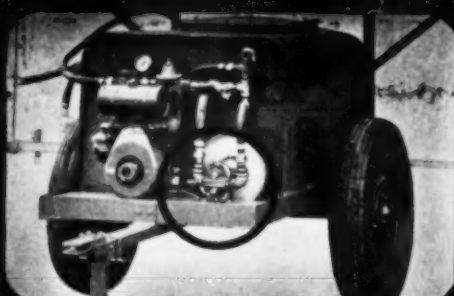
**Recommend Oberdorfer Pumps** with confidence for use with any power—direct drive from tractor P.T.O., pulley drive from tractor P.T.O., auxiliary gas engine, or electric motor. They are efficient and practical for any of these installations, recognized as the North American standard pump for spraying use.

We have prepared a new folder showing these different applications, and including performance tables for different sized pumps at various R.P.M.'s. This folder will help you sell more Oberdorfer Pumps. It is available in quantities to Oberdorfer dealers for distribution to your customers, if you wish. Write for a copy today—ask for Bulletin A-2.

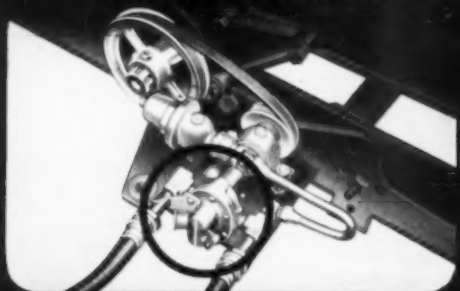
**AGRICULTURAL PUMP DIVISION**  
Oberdorfer Foundries, Inc., Syracuse, N.Y.



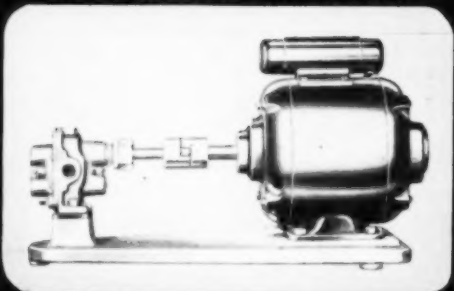
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**with AUXILIARY GAS ENGINE**



**with PULLEY DRIVE**



**with ELECTRIC DRIVE**

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**do you demand** dependable, day-in, day-out  
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**do you demand** cushioned-stitched multiwalls  
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**do you demand** automatic weighing, filling,  
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If you pack chemicals, foods or fertilizers, there's a BAGPAKER machine to help you do the job better and faster at obvious savings in labor and production costs. Write for our booklet No. 100A, "Quick Facts on Bagpak Machinery and Multiwall Paper Bags".



# Your employees want to help you build security

## HERE'S HOW 7,500,000 WORKERS ARE DOING IT

More than 20,000 companies now maintain the Payroll Savings Plan, by which their employees invest in U. S. Savings Bonds automatically every pay day. This Plan builds security not only for the individual employees, but for their companies and for the nation!

As you know, Savings Bonds pay \$4 at maturity for every \$3 invested. Thus they help create a "rainy-day" fund for each Payroll Saver, increasing his security.

### How P. S. P. helps employers

America's leading corporations report these *company* benefits from the Payroll Savings Plan: As Bonds increase the worker's economic peace of mind, plant morale improves. Production increases—because absenteeism, labor turnover, and the accident rate all decline. Relations improve between employer and employee.

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### Proof that employees want P. S. P.

Practically everybody wants to *save*. Every one of your employees could be saving *more* if he were obtaining Savings Bonds regularly, right where he works. Even with today's high prices, it has been proved that between 40% and 60% of America's working millions—at any wage level—can and will buy Bonds through Payroll Savings *if management sponsors the Plan and if a fellow worker asks them to sign up.*

Yes—your employees want to help you build security—for all of us. It's up to you whether they get the chance. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. While it's on your mind, why not call him? Or write the Treasury Department, Washington 25, D. C.

The Treasury Department acknowledges with appreciation the publication of this message by

## AGRICULTURAL CHEMICALS

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council.



## THE EDITOR COMMENTS

HAT there should be "no real shortage of fertilizer nitrogen in the United States next spring," is the conclusion of the subcommittee on fertilizer of the House committee on agriculture, in its report and recommendations made recently to the chairman of the Committee on Agriculture.

The report states that "On the basis of the information presented to the committee during and since the 1949 hearings, it has reached the conclusion that the supply of nitrogenous fertilizer materials available to farmers in the United States is approaching a balance with present demands and that if the plants now being operated by or under construction for the Army are operated throughout the fiscal year 1950 for the purpose of supplying export commitments, there should be no real shortage of fertilizer nitrogen in the United States next spring."

Although the word "if" appears in connection with the Army-run plants taking care of export commitments, it looks as though the nitrogen supply situation will be at least greatly relieved by next spring, even if it should fail to meet the entire demand.

It is interesting to discern the optimistic note which predicates the outlook—that demand for increasing amounts of fertilizer materials will continue in the U. S. The tremendous educational value of the past seven or eight years in demonstrating the effectiveness of fertilizer use, should have a profound effect on the thinking of farmers in the future.

Since the lack of nitrogen has been a limiting factor in the production of fertilizer in the U. S. during the past several seasons, it is our guess that once this deficiency is overcome, the annual U. S. Department of Agriculture consumption report can well herald further significant increases.

Wise fertilizer manufacturers, however, are keeping their sales machinery well oiled and on the alert for increased competition and sales resistance. While the availability of nitrogen may be welcomed at first sight, it should not be overlooked also as a possible harbinger of keener competition.

DISCUSSIONS about whether or not certain insecticides imparted an "off-flavor" to potatoes and other edible crops have been heard in both public and private for some time. Some expressed the belief that the taste of BHC, for instance, wasn't so bad after all, while others stoutly maintained that even the slightest hint of its musty odor would completely ruin any food.

Tests made at the Connecticut Agricultural Experiment Station on the palatability of potatoes grown in soil treated with BHC, chlordane and toxaphene have been released in the June 1 issue of the *Journal of Agricultural Research*, and may present a basis for further discussions along this line.

In the case of benzene hexachloride, the report says, the intensity of flavor increased with the dosage of insecticide and was detected even at the minimum level tested, of one pound per acre. "Although inconclusive," the summary states, "the evidence suggests that potatoes grown in soil treated the preceding year carried the same flavor." Apparently, the pure gamma isomer of BHC also imparted a foreign flavor to potatoes, but the flavor was less objectionable than with the crude form.

Tests on potatoes grown in chlordane and toxaphene-treated soils brought inconclusive results, but any flavor from these was much less objectionable than the flavor of BHC, the investigators noted. So here is how the results stand to date. Opinions and findings still seem to differ.

ESPITE the recent news of successful efforts to synthesize pyrethrum, the inroads of other synthetics during the past five years, and the uncertainties of the coming season, importations of pyrethrum from Africa are expected to be more than twice the amount shipped to the U. S. last year. Imports of some 7 million pounds of pyrethrum flowers are anticipated in 1949, as compared with only 3,633,158 pounds last year. The price is likely to increase, importers say, since inventories are low and potential demand heavy.



However, it should be remembered that although this year's imports may be double those of last season, both are far short of the all-time peak reached in 1946 when 20,475,967 pounds of pyrethrum flowers arrived in the U. S. Whether or not demand for pyrethrum ever again will push the total so high remains a moot question. Some have stated that the current ruckus about toxic residues on foods may help to bring this about; but others, considering the formidable possibilities in connection with synthetic production of pyrethrin-like esters, can see a competitive battle royal looming in the future.

And perhaps not too far into the future, either. Since the U.S.D.A. announced its success in "synthesizing pyrethrum" on March 15, industry research staffs have concentrated on the idea and have come up with workable manufacturing procedures which have already put the material on the market on a limited scale.

**T**HE June 25, 1949 deadline for the registration of certain pesticides has come and gone, and the question now is, are your insecticides, fungicides, disinfectants, herbicides and rodenticides registered with the U. S. Department of Agriculture? Are they also registered in the states in which you do business? If not, trouble lies directly ahead!

A recent statement by Dr. C. C. McDonnell, well-known Washington consultant and retired Chief, Insecticide Division of the U.S.D.A., should strike an ominous warning to any in the trade who have neglected to register every product which is required to be registered under the law.

Dr. McDonnell's statement is as follows:

"Under the terms of the Federal Insecticide, Fungicide and Rodenticide Act, which was enacted by Congress and approved on June 25, 1947, the deadline for the registration of herbicides and rodenticides with the U. S. Department of Agriculture was December 25, 1947, and for insecticides, fungicides and disinfectants June 25, 1948, except the Secretary of Agriculture, upon application, was authorized to exempt from registration for a period of one year articles subject to the Act under certain conditions as specified by Section 15 of the Act, which period has now expired.

*"There are still many of these products being shipped interstate that have not been reg-*

*istered, and the shippers of such products are, of course, subject to the penalty provisions of the Act.*

"This new Federal Law is much broader in its scope than the old Insecticide Act of 1910 and some of its provisions, particularly those requiring "poison", "caution" and "warning" labeling, required much study and investigation to determine and decide upon statements that would be adequate to protect the public from injury through the handling and use of products covered by it. The Insecticide Division of the Department of Agriculture, which administers this Act, recognized the difficulties involved and has been very cooperative and helpful in aiding manufacturers in preparing labeling.

"In view of the time elapsed, and the information distributed and aid given, it can be expected that more attention will now be given the enforcement provisions of the Act, and manufacturers should exercise every care to see that their products are properly formulated and labeled before shipment. The penalties for violation under the new law are much more severe than under the law which it replaced."

**I**N its recent report, the House Subcommittee on Fertilizer made the following recommendation: "... it should be understood as the definite policy of Congress that the Army should continue . . . fertilizer production . . . only so long as a shortage exists and then only for the purpose of taking care of exports to Japan, the Ryukus, and S. Korea, and only to the extent necessary to meet the requirements of those areas without depriving American agriculture of nitrogen fertilizers. It believes that when and as nitrogen fertilizer supplies become adequate in the United States, procurement for non-military exports should be made through normal commercial channels, with small fertilizer producers and processors given full opportunity to participate in such export program."

This statement is significant, particularly that part which states: "... only so long as a shortage exists." In short, when the war emergency is over, the Army should get out of the fertilizer business,—and let the industry, adequately equipped to take over, carry on in the export markets. We trust that Congress will follow this recommendation fully and promptly in due course.



## Control of Weeds & Brush along rights-of-way, with

# NEW HERBICIDES

**W**ITH an estimated 25,000 acres of utility rights-of-way sprayed with 2,4-D and 2,4,5-T in 1948 for control of brush, use of these materials for this purpose is considered to be out of the experimental stage. Past performances have proved the ester formulations of 2,4-D and 2,4,5-T to be more effective on a wide variety of species and under more varied climatic conditions than the salt derivatives. Among the merits of the ester formulations is their solubility in the leaf wax, which explains, in part at least, their superiority over the salts. This property also reduces the likelihood of the active chemical being washed from foliage in the case of rain following shortly after application.

Experience has pointed out numerous additional angles in chemical control of brush. For instance, it has been found that a greater degree of root kill is usually obtained when comparatively young

by  
**Lawrence Southwick**

Dow Chemical Company,  
Midland, Michigan

brush is treated. Less spray volume is required, which of course reduces the cost of application. To obtain an optimum root kill, it appears best to cut tall brush and spray the suckers or sprouts when they are from three to six feet tall. Although a good kill of brush has been obtained when it had attained a height of fifteen or more feet, this practice is not recommended as a rule.

Timing of application is of utmost importance, as evidenced by the amount of discussion regarding this phase of control. Good results have been obtained during the period from the first full leaf stage until two or three weeks before frost. Some observers believe that it is best to spray foliage when it

is growing rapidly, but field results on woody species have not always been in full agreement with this. Actually, careful research has shown that the movement of 2,4-D from the leaves to the stem of the plant takes place most readily when the plant is translocating carbohydrates in the same direction. In the stem, the 2,4-D moves both upward and downward. Obviously, large acreages cannot be treated economically within a short period; so spraying operations must spread over a major part of the growing season.

Thousands of experimental tests have been conducted in the United States and Canada to determine the concentration and volume requirements necessary to obtain best results. These tests have ranged from very low concentration (high volume) sprays to highly concentrated (low volume) sprays. Some users of 2,4-D and 2,4,5-T have been disappointed in the re-



Using adjustable gun to spray brush on right-of-way. Spray reaches weeds some distance from operator. Photo from Dow Chemical Co.

suits obtained from too dilute a spray, inadequate coverage and certain other factors. Recommendations today are based on four years of field work and spraying of more than 20,000 acres of brush. Both 2,4-D and 2,4,5-T have shown effectiveness against a wide variety of woody species. Some species are easy to kill; others show more resistance. Certain ones are apparently more susceptible to 2,4,5-T than to 2,4-D including sweet gum, osage orange, some oaks, poison ivy, elm, maple, blackberry, raspberry, hickory, ash, rose, ribes, basswood, dogwood, meadow sweet and others.

For general brush control the authors suggest the use of one and one-half to two quarts per 100 gallons of water, of each of the following: (1) an emulsifiable 2,4-D ester formulation\* containing 3.34 pounds acid equivalent per gallon and (2) an emulsifiable 2,4,5-T ester formulation\*\* containing 3.34 pounds acid equivalent per gal.

The spray is applied in sufficient quantity to wet the foliage and stems thoroughly. This is important since practically all living surface plant cells absorb 2,4-D and 2,4,5-T and it is necessary, in order to get the best kill, to have a lot of growth

substance absorbed and translocated within the plant. The spray volume required per acre will vary widely—as much as from 100 to 250 gallons. A 100% kill of brush from the first spray application should not be expected. If the esters of 2,4-D and 2,4,5-T are applied at the suggested concentration and adequate coverage is obtained, a 75% or more reduction in subsequent regrowth may be realized. One application per season is suggested. A second application the following season may be an overall or spot treatment depending upon uniformity of recovery. These applications will in many instances practically eradicate most woody vegetation from the right-of-way. Third and fourth year applications will usually consist only of spot treatment. As a basis for determining cost of treatment the program should be planned on a five year basis.

Power wagons with 150-250 gallon spray tanks equipped with peccan or orchard type spray guns have been used extensively for right-of-way spraying. For such operations, the spray equipment should be capable of maintaining 150-400 pound spray pressures.

Spray guns should be adjustable so that operators can easily cover foliage near at hand as well as at some distance away. Each spray

rig should carry enough extra hose (1,000-1,500 feet) to reach locations where the motive equipment cannot go. A feeder truck may be used to supply chemicals and water to two spray rigs working side by side on a right-of-way.

Naturally, every effort should be made to keep all the spray within the area to be treated. Drift to adjoining property must be taken into consideration regardless of equipment used, but it is minimized when a dilute spray is applied properly with spray guns. When spraying rights-of-way, adjoining forest or pasture land, drift is usually not a problem provided reasonable care is taken. Where the sprayed area adjoins crops such as cotton, tobacco, tomatoes, beans, grapes, garden crops and many flowers and ornamentals which are very sensitive to spray drift of esters of 2,4-D and 2,4,5-T, utmost care must be taken to avoid all drift. A certain amount of drift may be avoided by reducing the spraying pressure, since high pressure breaks down the droplet size. The smaller the droplet, the greater the distance it will travel on a given wind velocity; and by the same token, larger droplets will tend to settle more quickly. If there is any serious question about spray drift, the best decision is probably *not to spray*.

Frequently, areas are encountered where it is impossible for power-operated equipment to reach all portions where spray is to be applied. In this case, two to five gallon knapsack sprayers can be used to apply low volume sprays. Probably the same amount of 2,4-D and 2,4,5-T should be applied by this method as with the power equipment. Both water and oil have been used as carriers and satisfactory results have been obtained. Uniform coverage is of utmost importance but, of course, complete wetting will not be possible. The total volume of spray required will depend upon the density and height of vegetation. Under many conditions 15-30 gallons of spray

\* Marketed by Dow Chemical Co. under the trade name of "Esteron 44."

\*\* Marketed by Dow Chemical Co. under the trade name of "Esteron 245."

per acre will give satisfactory coverage provided this volume is applied uniformly to the foliage and contains sufficient amounts of the chemical.

### Stump Treatment

**E**xtensive tests have been made using water, organic solvents and many different oils as carriers of the esters of 2,4-D and 2,4,5-T for stump treatment with knapsack sprayers. None of the carriers has proved significantly better than kerosene, diesel oil and the various grades of fuel oil. Water has shown somewhat less promise. Comparative tests have been made at different seasons of the year with minor differential results. Apparently, stump treatment following cutting can be done at any season.

Many tests have been made using light and heavy wetting at several different concentrations. These tests have shown that adequate coverage is equally as important as concentration. A liberal wetting of the freshly cut surface and the surrounding bark should be given. As with foliage sprays, the isopropyl ester of 2,4,5-T seems to be somewhat more effective than the same ester of 2,4-D on certain species. The authors suggest for general stump treatment a mixture of one pint of emulsifiable 2,4-D ester formulation and one pint of 2,4,5-T ester formulation (each containing  $3\frac{1}{2}$  pounds acid equivalent per gallon) in five to ten gallons of diesel or No. 2 fuel oil. These are equivalent to about 2.5-5% by volume, or 10,000-20,000 ppm.

The use of 2,4-D and 2,4,5-T for stump treatment during winter, fall and early spring months adds tremendously to the versatility of chemical control of woody vegetation. One man using a knapsack sprayer can spray all stumps and stubs that a good sized crew can cut on an average right-of-way. There is but little hand labor involved in treating stumps by this method and the per acre cost of chemicals is low. In areas where cotton and other susceptible crops

are grown near the right-of-way, stump treatment is less hazardous than foliage spraying. Experiments by a number of investigators have shown that this is an economical and successful method often resulting in about the same progress toward eradication as would be obtained by a single foliage spray.

A knapsack sprayer equipped with oil resistant check valves, pump leathers and hose is standard equipment for this job. A pressure of 15-25 pounds per square inch is sufficient. The fan type of spray nozzle is held close to the stumps or stubs, or close to the ground when spraying in order to minimize spray drift. It is suggested that the spray should be applied within two or three days after cutting, if possible. Various methods have been used for marking stumps that have been treated and several organic oil soluble dyes have been tested. It is reported that one of the red dyes used in the textile industry looks promising for this purpose.

### Substations and Pole Yards

**T**he presence of any vegetation in pole storage yards and substations offers a fire hazard. In addition to the removal of weeds, brambles and woody vegetation from these areas, it is also desirable to control grass. Heretofore, this problem has been solved by use of

hand or machine cutting, contact herbicides such as oils, pentachlorophenol, dinitro phenols and others. These contact sprays kill the above ground vegetation, but do not affect the roots of perennial grasses to any extent.

For many years the weed experts have been looking for a grass killer that does not offer the fire hazard of sodium chlorate and the poison hazard of sodium arsenite. During the last three years, extensive tests have been made with a number of chemicals. One of the most promising to date is sodium trichloroacetate. This compound will be marketed this year to a limited extent in powder form which is readily soluble in water. The commercial product contains 70% sodium trichloroacetate.<sup>†</sup>

The herbicidal action of "Sodium TCA" appears to be principally through the roots and soil moisture is apparently an important factor. However, there is some evidence that the chemical may be translocated downward through the foliage to the roots, particularly with certain grass species in the more arid parts of the United States. When excessive rainfall occurs shortly after application the "Sodium TCA" may be subject to leaching, particularly on light textured soils. This is one reason why an application does not cause pro-

<sup>†</sup> Dow Chemical Co. markets this product under the trade name of "Sodium TCA 70%."

**Dead brush from combination of 2,4-D and 2,4,5-T. Note Comparative height of unsprayed brush. Photo courtesy of Dow Chemical Co.**



longed soil sterilization. The action of this material on several grass species has been noted and the results indicate that these grasses can be retarded or killed: Johnson, Bermuda, para, quack, Kentucky blue, Canada blue, red top, orchard, timothy, buffalo and smooth brome. In addition, a number of winter annual grasses have been found to respond often at lower dosages than required for established perennials. Relatively small amounts applied to the soil often prevent the emergence of grass seedlings. Prickly pear cactus has been controlled with "Sodium TCA" and it has also shown promise on palmetto.

The soil sterility from "Sodium TCA" is usually of relatively short duration, that is 1-3 months. Its toxicity is about the same as table salt, and it is compatible with 2,4-D and 2,4,5-T formulations in water sprays. In addition, it can be used with contact weed killers such as emulsifiable pentachlorophenol and dinitrophenol formulations. Its action is relatively slow when used alone. For established stands of perennial grasses, the use of 100-200 pounds of "Sodium TCA 70%" per acre is suggested.

### Highways

**C**HEMICAL weed control along highways is rapidly becoming a firmly established and economically sound practice in many counties of the several states. Knowledge of application methods and product refinements now make

chemical maintenance a wise choice for most highway weed control problems.

Where woody plants or hard-to-kill herbaceous perennials are the chief problem, combination sprays using "2,4-D and 2,4,5-T esters can be utilized as already suggested. 2,4-D liquid amine salt sprays have proved very effective against most herbaceous weeds and some of the less resistant woody species. They have given fair results on poison ivy but probably are not quite as reliable as 2,4,5-T esters." They are somewhat safer to use in areas bordering crop land and ornamentals than the "Esterons," although *spray drift is always a factor no matter what 2,4-D or 2,4,5-T formulation is used.*

In most areas, and especially where vegetation is dense, application with an orchard type spray gun will prove efficient. There are many areas where vegetation should be controlled some distance from the road, such as at grade crossings and intersections where brush or high weeds form a hazard in terms of obstructed vision. Several equipment manufacturers offer rigs with spray booms designed for, or readily adaptable to, highway work. Boom application is most satisfactory where high pressure and high volume are not re-

quired. A boom should be rigged to extend to the depth of the right-of-way insofar as possible and from the right side of the applying vehicle. It should be rigged so that it may be raised or lowered by the operator to conform with the slope of the shoulder or to avoid obstacles. Many such rigs have a jointed boom so that the outward section may be lowered or raised independently of the first section.

The volume and pressure required vary directly with the density of the weed growth to be controlled. For example, to control dandelion, plantain, thistle and similar weeds in the attractive turf bordering our better highways, it is suggested to use low pressure (40 pounds), low gallonage (15-30 gallons per acre), and nozzles giving a coarse spray. Here 2,4-D amine salt may be used at one and one-half to two pounds acid equivalent per acre in twenty or more gallons of water. On the other hand, where weed growth is vigorous, tall and dense, two pounds of acid equivalent per 100 gallons of water may be used in sufficient spray volume to give adequate coverage, which means rather complete wetting of foliage. This may require up to 300 gallons of spray per acre. 2,4-D ester may also be used and will be more effective if certain types of brush predominate. It should be stressed again that coarse, low pressure sprays do not present the drift hazard of fine, high pressure sprays.

In some areas where it is desir-

Experimental roadside spraying with 2,4-D. Chemical control is proving to be more effective and less expensive than hand methods. Photo Courtesy Dow Chemical Co.





able to remove temporarily all vegetation including grasses, a dinitrophenol or pentachlorophenol contact type of herbicide is employed two or three weeks after 2,4-D is used. Kill of top growth is obtained, but perennial plants and grasses will, of course, recover. Also, "Sodium TCA" should find an important place along highways and around various highway structures when used in accordance with directions.

#### Railroads

**A** MORE concentrated effort has been made to control vegetation on the road bed ballast, both between and outside the rails, than any other place on the right-of-way. On many roads, a strip two to five feet wide outside the ballast section on both sides of the track is kept free of vegetation. The total area represents about two acres per mile of track. In many instances it is not necessary to treat between the rails since no vegetation is present on some well-ballasted track. Various methods, both mechanical and chemical, have been used. Mechanical methods of weed control include weed pulling, hoeing, spading, mowing, burning and steaming. Chemical control, until recently, consisted largely of creosote, oils, sodium arsenite, sodium chlorate, and boron compounds.

Of these, sodium arsenite has been used for many years. It acts as a contact herbicide and also through the roots. It is a soil sterilant, if used in sufficient quantities. Its poison hazard is significant. Sodium chlorate has been, and is being used extensively for the control of vegetation on the ballast section. In many instances, it has done a satisfactory control job, although one of its weaknesses lies in its fire hazard. Boron compounds have been utilized in dry form and, when applied in sufficient amounts, have a significant soil sterilant action. Weed killing oils have been used quite commonly by some railroads and, if sufficient oil is applied, good weed control results. Vegetation control

is mostly through contact action.

During the last few years, a number of railroads have been experimenting with some of the newer herbicides such as the salts and esters of 2,4-D and 2,4,5-T as well as the dinitrophenols, pentachlorophenol, sodium pentachlorophenate, sodium trichloroacetate and others.

The 2,4-D products which seem to be the most applicable for use on road beds are the sodium and amine salts. Both products can be used in water sprays. They have no significant value in controlling established stands of perennial or annual grasses. Salts and esters of 2,4,5-T have not been evaluated as thoroughly as the 2,4-D products. However, it is known that 2,4,5-T is more effective on some hard-to-kill species than is 2,4-D.

Contact herbicides such as dinitrophenols, pentachlorophenol and sodium pentachlorophenate are being used to an increasing extent as "chemical mowers" on road beds. The free phenols in oil are more effective than the salts in water solution in contact action on vegetation. Emulsifiable oil concentrates containing these phenolics are applied with additional fuel or diesel oil in water. Adequate agitation in the tank cars is of prime importance. The phenolics kill annual grasses and weeds and the top growth of perennial plants when used properly. The rate of regrowth of perennials depends upon a number of factors including temperature, soil moisture, and, of course, the time of year the spray is applied. In some instances, regrowth is evident two to three weeks after application. In certain arid areas in the southwest, one application per season may control the vegetation satisfactorily, while in the southeast, two and three applications may be required.

During 1948, sodium trichloroacetate, then comparatively new, was being widely tested for the control of annual and perennial grasses on road beds. When used in adequate amounts, grasses are

killed whereas at lower dosages, they are checked significantly. "Sodium TCA" shows exceptional promise for road bed use.

Since there is no single herbicide to control all annual and perennial weeds and grasses satisfactorily and economically, there has been considerable experimental work on combinations of different herbicides. This work has been undertaken in cooperation with the railroads and the service organizations that apply weed killers for the railroads.

A combination of sodium trichloroacetate—2,4-D salt offers the advantage of water solubility. The addition of oil is unnecessary and there is no problem of emulsification and continual spray agitation. Water is available as a diluent or carrier on most railroad lines. The sodium trichloroacetate may be shipped as a water concentrate in tank cars in the same manner as sodium arsenite and sodium chlorate. The sodium trichloroacetate concentrate can then be diluted on the job with additional water and 2,4-D added from 50 gallon drums or tank car. A suggested spray can be made up of 200 pounds of "Sodium TCA 70%", 2 gallons of a 40% 2,4-D amine product, and water to make up 300 gallons of spray. This should treat one mile of track or from 2 to 2½ acres.

Using the phenolic-oil-sodium TCA combination, a spray application could consist of 1.5 gallons of weed killer† containing approximately 5 lbs. of dinitro-o-sec-butylphenol per gallon, or 15 to 25 pounds of pentachlorophenol, 50 gallons of oil, 100 to 200 pounds of "Sodium TCA 70%" previously mentioned, and water to make up 300 gallons of spray.

With this mixture, adequate mechanical or air agitation in the spray car is essential to maintain a uniform mixture. With either of the above spray mixtures, lower amounts of chemicals may do a

†† Dow markets this product under the trade name of "Dow General Weed Killer".

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# NFA Speakers Picture A Bright Outlook for FERTILIZER INDUSTRY

**A**TTRACTING a record registration of more than 600, the National Fertilizer Association held its 24th Annual Convention at the Greenbrier Hotel, White Sulphur Springs, West Virginia. The meeting began on June 13 and continued for three days.

Louis Bromfield, lecturer and author, told the group that although American agriculture has made more progress in the past 15 or 20 years than it has in many decades previously, we still possess not more than 10 percent of the knowledge necessary to reach the ultimate in food production. He made a strong plea for intensified efforts toward soil conservation "before it is too late," and reminded that although the United States started out with the richest agricultural area in the world, ignorant and greedy management of what once appeared to be limitless lands has greatly reduced this early advantage.

Mr. Bromfield termed as "idiotic" the saying that "anyone can farm," pointing out that the science of agriculture has become one of the most complicated of studies. The old idea that only the "dumb" children of a family remain on the farm while the brighter ones go to the urban areas to make a fortune, is obsolete, he declared. Such an attitude has cost the country millions. The process is now reversed, he stated. The "bright" children remain on the farm and manage its affairs scientifically.

The talk by Mr. Bromfield was presented at the Tuesday morning session, following the annual convention address by Ray King, chairman of the NFA board of directors. Mr. King warned the convention that the sellers' market



Dr. Russell Coleman  
N. F. A. President

which characterized the past few years no longer exists. Fertilizer materials manufactured and marketed by the industry must pay their way, "and then some," he added. The industry must not only be useful to agriculture in furnishing plant food materials, but it must let the public know what it is doing.

As a suggested means for educating the public, Chairman King mentioned the use of moving pictures, attendance at scientific meetings, and through the reading of reports of progress in the field. He pointed out that the NFA film, "What's in the Bag" is a good example of education through that medium, and reported that it is being shown to audiences in many parts of the country.

He commented briefly on the trends in legislation which would regulate the distribution and use of chemicals for agriculture, and urged the fertilizer manufacturers to contact their representatives in Washington to protest against continuing competition by the Federal Government. He also said that the

propaganda issued by groups which advocate "organics only" and deny the use of commercial fertilizer materials should be answered by the fertilizer trade. He declared that although the informed person is not at all convinced by the arguments of these groups, there are numerous persons who think that the nation is being poisoned through the use of commercial fertilizer materials in food production.

The board chairman then reviewed the activities of the Association for the past year, and pointed out the progress made in that time.

Charles H. Mahoney, Director, Raw Products Research Bureau, National Canners' Association, Washington, D. C., discussed some of the problems involved in producing higher quality food at a higher rate per acre. He pointed out the importance of proper application of fertilizer materials, and declared that demand for newer and better methods is ahead of corresponding research. Application of fertilizer is but one phase of soil nutrition, and other aspects of the problem are of equal importance, he said.

Production per acre has been increasing steadily since the early 1930's, he reported. Much of this increase has been due to increased knowledge of soil nutrition and the use of other chemical materials for production. The per capita consumption is up about 12 per cent, and the housewife is demanding more and more quality in the food she buys, and at a lower per unit cost.

Canners are interested in human, rather than animal nutrition, he reminded and research in this direction has brought about marked

## Greenbrier Meeting Called Great Success

improvements in the chemical composition of crops.

Mr. Mahoney declared that there must be an increasing distinction between "hokum and facts" in the field of nutrition. He lamented the appearance of "too many amateur articles on nutrition," stating that these half-truths serve merely to confuse the public and to make it suspicious of both harmless and beneficial advancements in the application of fertilizer materials. "We need much more factual information," he said, and urged the establishment of a special program along the educational line.

He called on the fertilizer industry to give the farmers sound methods of producing cropping crops, and to educate them in the use of precision methods of agriculture as contrasted to the former loose and unscientific means employed previously.

"Soil Factors Affecting Responses of Crops to Fertilizers" was the title of a talk by George N. Hoffer, Manager of the Midwest Office, American Potash Institute. He prefaced his remarks by stating that it is difficult in discussing agricultural subjects to call any finding "new", since many of the discoveries of recent date have been found to have been used long ago and later forgotten.

With a series of colored slides, Dr. Hoffer showed the convention a wide variety of tests made in various soils to demonstrate the relationship of soil condition to the health of the plant grown in it.

Many of the slides illustrated the results of packed down soil which prevented the flow of natural nutrients throughout, and resulted in half-starved crops. He illustrated

the necessity for an adequate supply of oxygen in the soil by showing samples where there had been a lack of oxygen.

The afternoon of Monday was devoted largely to an agronomic

### Prize Donors Listed

Donors of prize money for winners of various contests at the NFA convention were listed in alphabetical order, as follows:

**Agricultural Chemicals Magazine, New York**  
**Allen Scale Co., Atlanta, Georgia**  
**Allied Chemical & Dye Corp., (Barrett Div.), New York**  
**American Cyanamid Co., New York**  
**American Potash & Chemical Corp., New York**  
**Arkell & Smiths, Canajoharie, N. Y.**  
**Ashcraft-Wilkinson Co., Atlanta, Ga.**  
**Atlanta Utility Works, East Point, Ga.**  
**Baker, H. J. & Bro., New York**  
**Bemis Bros Bag Co., New Orleans, La.**  
**Chase Bag Co., New York**  
**Chilean Nitrate Sales Corp., New York**  
**Combustion Engineering Co., Inc., Raymond Pulverizing Division, Chicago, Ill.**  
**Coronet Phosphate Co., New York**  
**Dowling Bag Co., Valdosta, Ga.**  
**E. I. duPont de Nemours & Co., Inc., Wilmington, Del.**  
**French Potash & Import Co., Inc., New York**  
**Fulton Bag & Cotton Mills, Atlanta, Ga.**  
**Georgia Fertilizer Co., Valdosta, Ga.**  
**Georgia Lead Works, Atlanta, Ga. (Division of National Lead Co.)**  
**Frank G. Hough Co., Libertyville, Ill.**  
**Hydrocarbon Products Co., Inc., New York**  
**International Minerals & Chemical Corp., Chicago, Ill. (Phosphate Rock and Potash Divisions)**  
**International Paper Co., Bagpak Div., New York**  
**Kraft Bag Corp., New York**  
**Lion Oil Co., El Dorado, Ark.**  
**Mathieson Chemical Corp., New York**  
**Mente & Co., Inc., New Orleans**  
**Nicolay Titlestad Corp., New York**  
**Phillips Chemical Co., Bartlesville, Okla.**  
**Potash Co. of America, New York**  
**Schmutz Manufacturing Co., Louisville, Ky.**  
**St. Regis Sales Corp., Multiwall Bag Div., Allentown, Pa.**  
**Sturtevant Mill Co., Boston, Mass.**  
**Spencer Chemical Co., Kansas City, Mo.**  
**Swift & Co., Plant Food Division, Chicago, Ill.**  
**Synthetic Nitrogen Products Corp., New York**  
**Texas Gulf Sulphur Co., New York**  
**Union Bag & Paper Corp., New York**  
**Union Special Machine Co., Chicago, Ill.**  
**U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.**  
**United States Potash Co., New York**  
**Werthan Bag Corp., Nashville, Tenn.**

pasture tour by members of the Plant Food Committee and a number of others from the convention. Traveling by car, the 40 men visited five farms in the vicinity of White Sulphur Springs and Lewisburg, West Virginia. Operators of these farms described to the visitors how fertilizer materials and improved farm practices have resulted in heavier stands of grass and more nutritious animal feed. The expedition was led by Linwood Young, Soil Conservation Service, Lewisburg, W. Va., and by Dr. Malcolm McVickar, NFA agronomist.

### Dr. Coleman Speaks

**D**ISCUSSING the part to be played by the fertilizer industry in safeguarding the future, Dr. Russell Coleman, NFA president, told the convention that long before the nation knew or appreciated the manner in which the fertilizer industry was contributing to the general welfare, the necessity of producing better fertilizer materials cheaply was recognized by the industry leaders. Without the contribution of the fertilizer industry, the American farmer would be producing at least twenty percent less than now, while farm commodity prices would be much higher, Dr. Coleman said.

Looking into the future, the NFA head predicted that the problems lying ahead will probably be more complex than ever before. "The constantly increasing population will place increased demands upon the farm for more and better quality products", he declared. Such a demand will increase the rate at which plant food is consumed by growing crops, and will thus endanger the productivity of soils. To remedy this situation, more research will be necessary, and certainly more fertilizers with perhaps an increasing number of elements, will be required. "Increased competition at home and abroad will probably force the farmer to produce more efficiently and to make more profit per acre. There will probably be more and more demand for higher analysis fertilizer ma-



terials and mixtures to reduce the per-unit cost on the farm.

"Therefore, meeting these demands will require not only the best ingenuity of the individual members of the industry, but also will involve even closer relationship and understanding with the farmer, the agricultural leaders, and the general public." Dr. Coleman stated that the Government must understand the problems of industry and also recognize its own responsibility. It should allow and encourage the production of the nation's commercial fertilizer supply by private industry which has demonstrated that it can produce and distribute fertilizer more cheaply than government-operated plants. He also called upon Government to aid industry by planning its agricultural programs far enough in advance

#### In the Photos:

Top row, (L to R) Dr. H. B. Mann, president, American Potash Institute, Washington, D. C.; G. Frank Seymour, Goldsboro, N. C.; Dr. M. H. McVickar, chief agronomist NFA; Kent Leavitt, speaker; F. S. Lodge, assistant to the president; Dexter M. Keezer, speaker; and Robert H. Engle, NFA agronomist.

Second row: M. H. Lockwood, former NFA president; Daniel B. Curll, Jr., New York; L. Graham Campbell, NFA board member, Cranbury, N. J.; and M. V. Bailey, New York. Louise F. Mertz, Dorothy Freyksen, Eloise Nelson and Miriam C. Vance at registration desk.

Third row: Mr. Engle; Dr. McVickar; H. H. Tucker, Columbus Ohio; and Linwood Young, Soil Conservation Service, Lewisburg, W. Va. (Photo taken on pasture tour Monday p. m.) Ray L. King, chairman, NFA board of directors; R. H. Roop, Baltimore, Md.; E. A. Simpson, Boston; and Wm. Lehmann, New York.

Fourth row: Dr. J. W. Turrentine, president emeritus, American Potash Institute; F. H. Perrin, Chicago; Colin W. Whittaker, U. S. D. A., Beltsville, Md.; Hugh Craig, editor, *Oil, Paint and Drug Reporter*, New York. Carl R. Sparks, Seymour, Ind.; R. E. Bennett, S. Omaha, Nebraska; and L. S. Van Natta, Blytheville, Arkansas.

Bottom row: Louis Bromfield, speaker, explains a point to an unidentified listener; last photo: T. W. Allen, Attalla, Alabama; J. Rucker McCarty, East Point, Ga.; and A. A. Schultz, Reading, Pa.

that the industry might plan its research, educational and production programs to work more closely with Federal and State agencies.

To safeguard freedom, the government must recognize the profit system which allows industry a reasonable return on its investment, Dr. Coleman declared. Such profit makes possible a high standard of living for labor and also allows adequate maintenance and improvement of the physical plant and tools necessary for efficient production.

Dr. Coleman presented a four point program for the fertilizer industry to follow in discharging its obligations to the cause of freedom. In the first place, he said, continued research must be supported and encouraged. He pointed out the need for research by individual companies to be aligned with that of the U. S. Department of Agriculture. Special emphasis was placed on determining what plant food elements or combinations are needed for soil fertility maintenance.

The second point was concerned with plant development and improvement. Facilities must continue to be built for producing efficient fertilizers in adequate amounts for an intensified agriculture, he said. "And, as in the past, savings in improved quality and efficiency will be passed on to the farmer", he concluded.

A completely coordinated program of education was called for in the third point. It is necessary for industry to understand better the aims and objectives of agricultural educational agencies and to work even more closely together toward implementing a better usage of fertilizers. The non-agricultural public also needs education on what fertilizers are, and how important they are to the general welfare, he added.

Finally, the Congress of the United States must be better informed on fertilizers and the fertilizer industry, he stated. Every member of the fertilizer industry was urged to inform his congressman of the advancements being

made in fertilizer manufacture. Frequent visits to congressmen to show the progress made in fertilizer plants should be a part of the industry's educational program, he declared.

Dexter M. Keezer, economist for McGraw-Hill Publishing Co., New York, following Dr. Coleman, told the assembly that the purchase of new machinery runs hand-in-hand with prosperity. Without the expenditure of funds for more modern equipment, stagnation and poverty come into the picture, he said.

Pointing out that it is "dangerous" to consider the industry already well-equipped, he reviewed the history of the past 25 years. He reminded that during ten years of depression, not much new equipment was purchased in the country, and that this period was followed by a boom for war, not for peace. As a result, many industries now find themselves in a run-down condition.

In considering where the money is coming from to do this job, Mr. Keezer condemned excessive taxes on corporate profits which he says are cutting profits 15 to 25 percent lower than last year. "This is raising havoc with prosperity", he declared. At present prices, much of the old equipment is not worth borrowing on, he observed.

As Congress continues to appropriate more and more money, there are two sources of Federal revenue competing for popularity with Congress, Mr. Keezer said. These are ideas to increase taxes on the higher income brackets, or to increase corporate taxes. Corporation profits are the prime target for tax law makers.

Part of industry's job in correcting the situation is through education, he said. "We haven't made a start in convincing the public that high positions in industry are earned and held by skill and work and not by favor. He pictured a mass feeling of jealousy on the part of the public. Many persons

Turn to page 67



## Pacific Slope Branch, AAEE

### Hears Discussions on How

# Insecticides Protect Food Supply

**W**ITH the Grand Canyon as a background, the Pacific Slope Branch of the American Association of Economic Entomologists, held its 33rd annual meeting at Bright Angel Lodge, Grand Canyon, Arizona, June 16-18. About 200 were registered, and the addition of wives and children of the registrants brought the total to nearly 300.

Chairman of the meeting was J. N. Roney, University of Arizona, Phoenix, who opened the initial session at 10 a.m. Thursday. He introduced the vice-chairman, H. M. Armitage, bureau of Entomology, State of California Department of Agriculture, Sacramento, who in turn presented the speakers of the morning.

These included Dr. H. C. Bryant, superintendent of Grand Canyon National Park; Dr. A. M. Boyce, Riverside, California, president of the American Association of Economic Entomologists; and C. P. Clausen, vice-president of the A.A.E.E.

Louis Shellbach, Park Naturalist of the Grand Canyon National Park, related the history of entomological research at the Canyon, stating that it had begun in 1906. Some 244 species of *Coleoptera* had been collected from the Park by 1934, and a new list, based on research since then, is due to appear shortly, the speaker said. Mr. Shellbach, an archaeologist, discussed a number of new species of butterflies which have been discovered in the area.

Dr. F. C. Bishopp, assistant chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, spoke on the "Long Term Implications of Recent Work with Organic Insecti-

cides". He pointed out that there is competition in the increase of population and food production . . . that there exists actually a "fight" between insects and man for the food and feed produced. Since the world has an increase of 20 million persons per year, this means that "there are some 55,000 more mouths to feed this morning than there were yesterday", he declared.

He commended the work of entomology in reducing the death rate by controlling the depredations of insects. He pointed out that about 2½ acres are required to furnish food and clothing for an average individual. The present status is 1.8 acres per person, which presents an obvious case for increased production, he said. "New acres must be developed, better use must be made of land already under cultivation, and wastage must be stopped", the B.E.P.Q. assistant chief declared. He stated further, that insects destroy at least five percent of harvested grain, and pointed out how far this five percent would go towards providing for many of our needs. "Infestations by these pests must be controlled," he concluded.

Insecticides, particularly the newer ones, have controlled potato aphid, potato leafhopper and other potato insects with a resultant increase in production of 20 percent over large areas, he reported. Sugar cane production has been increased from 27 to 47 tons per acre by control of wireworm. "It is unthinkable that we can go along without

insecticides when one sees such astonishing gains", he stated.

Reviewing recent developments in connection with the possibility of DDT residues appearing in milk, Dr. Bishopp told of close cooperation with the Food and Drug Administration, the Public Health Service and the manufacturing industry. He stated that all have been cooperative and helpful in solving the problems. Viewpoints must be modified as information develops, he said, but the presence of DDT in milk does present a definite hazard. As a substitute for DDT in dairies and on dairy cattle, Dr. Bishopp suggested the use of methoxychlor. He emphasized that the use of DDT during the war and since, has done a great deal of good in the control of many difficult insect pests and that it would have been unthinkable to withhold it from public use until there was available all the data which are now known about the toxicant.

Since there are now available insecticides which will give good control of most pests, there is at present less need for putting on the market as many new ones until their effect on plants, animals and human health is more completely established. Past attacks on new insecticides have been made largely by those "with axes to grind", Dr. Bishopp declared. "Those who have the facts should do more to inform the public so that they will not be misled by garbled information put out by extremists or others promoting selfish interests," he said. The B.E.P.Q. assistant chief emphasized that there are many limitations on the use of insecticides. He pointed out their specific uses, stating that "users must learn just what these are and must recognize

by

Dr. Alvin J. Cox



and observe them strictly. Otherwise, entomologists, industry and the public are likely to encounter many difficulties", he warned.

Continued research was urged by Dr. Bishopp as he concluded his talk. "Research is of particular importance to determine alternate methods of controlling pests", he said. "More work should be done on resistant varieties of crops and on developments of biological control. Eradication of some pests might be a way of avoiding continued use of insecticides where there are health hazards. The exclusion of pests by quarantine will leave fewer insects to control, and a better job of educating the user will not only reduce pests, but will also make possible the adoption of less strict legislation to control the use of economic poisons."

A discussion from the floor, following Dr. Bishopp's talk, brought out reports that flies in California have shown a resistance to methoxychlor, similar to the reported ineffectiveness of DDT. Success in biological control of black scale was discussed from the floor, with a number of opinions indicating that even if no insecticides were used in some cases, an ecologic study would show that parasitization was taking place.

Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Association, Washington, D. C., made a strong plea to "sell safe pest control", pointing out the zeal with which opponents of the use of certain chemicals in agriculture, are publicizing their views. He stressed the need for education "at all levels in the sound selection and use of agricultural chemicals." Although there has admittedly been some misuse of pesticides, this should be corrected through a sound educational program, without the creation of unnecessary fear, he said.

"Within the past two years, the attitude of the public, the press, and many other organized groups has changed from enthusiastic support of the general pesticide program, to one of doubt, and in many

cases, to violent criticism", Mr. Hitchner observed. This apparent change of attitude has been brought about by a number of factors, he said. Among these are over-enthusiasm both in the matter of publicity and promotion by "some segments both of industry and the government"; a revival of the residue-tolerance problem; criticism

This is Part I of Dr. Cox's report of the Pacific Slope Branch meeting. Since the meeting ended so close to our press time, it was not possible to include the full report here. It will be concluded in the August issue.—Ed.

by segments of the food industry and by certain organized groups such as the American Medical Association, various State Legislatures, garden clubs and the popular and technical press. Mr. Hitchner continued by stating that this condition "is having and will continue to have a profound effect on the industry, on government agencies, on the professional entomologists and on the user of pest control chemicals."

He brought out also the effect the general situation has had on legislation relating to the production and distribution of agricultural chemicals. A few of the proposed legislative acts were reviewed by Mr. Hitchner, who mentioned specifically proposals to bar the sale of a product in a state; the curtailment of air application; proposals for excessive fees, and other proposals contrary to the uniform labeling program; extension of the laws to cover diluents, etc.; banning certain pest control chemicals through public health agencies; proposals for seizure of materials before analysis; and sale through registered pharmacists only. Many bills which were introduced to various state legislatures during the past year would have resulted in materials being taken from the market or else they would have imposed undue hardship on

the producer, the distributor and the consumer.

Looking ahead, Mr. Hitchner said that probably the most important development is the prominent place to be occupied in this field by the Federal Food and Drug Administration. "Under existing law", he pointed out, "this agency is responsible for the public protection of the food supply of the country and the law provides that tolerances shall be established where they are necessary for the protection of the consumer. Residue from agricultural chemicals, therefore, becomes a major consideration of this agency". He reminded that the use of any "poisonous or deleterious substances" in food production must be justified, and that the F. & D. A. does not need to set a tolerance, if, in their opinion, other materials may be used with greater safety.

The N.A.C. Association secretary said that hearings on residue tolerances are expected to be held during the current year. "Industry believes that the prompt establishment of tolerances is a sound policy, and will cooperate willingly with the F. & D.A. in this program", he said. Some of the problems involved were outlined briefly, and Mr. Hitchner stated that the answers to these need to be found as quickly as possible.

Among the most urgent needs at present, he declared, are analytical methods to determine the technical chemical, its presence in formulations and in residues on foodstuffs; standard methods for taste and odor determinations; more effective antidotes for the agricultural chemicals now in use; educational programs on health hazards to operators; and distribution of information to physicians on diagnosis and treatment.

States represented at the Pacific Slope meeting included Arizona, California, Oregon, Washington, Montana, Wyoming, Colorado, Utah, New Mexico, Texas, Illinois, Minnesota, Idaho, New York, and Michigan as well as the District of Columbia and Canada.

# Material Handling . . .

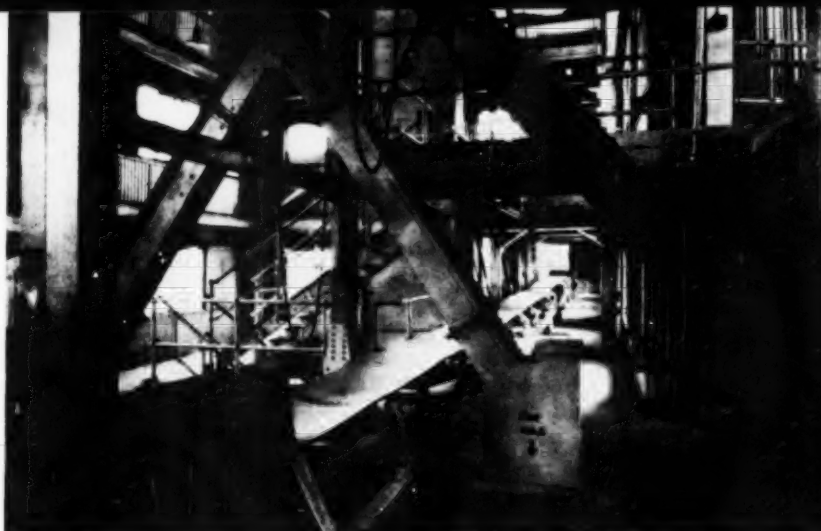
The trend toward mechanization in fertilizer, lime, and allied agricultural chemical plants, given great impetus by expanded war-time demand brings reduced labor costs, increased production, and over-all a more efficient industry.



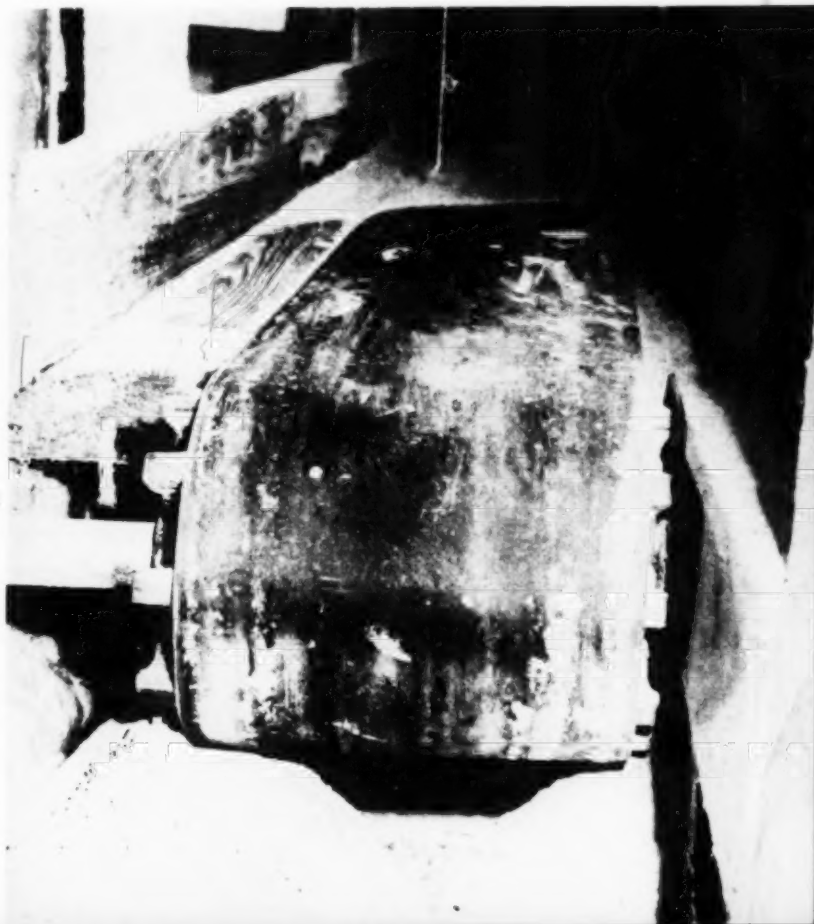
**A**LL told, something close to 45,000,000 tons of fertilizers, agricultural lime, insecticides, fungicides, and other agricultural chemical specialties are produced yearly in the United States at the current rate of operations. This figure is probably almost twice as large today as it was ten years ago. The over-all tonnage of raw materials involved in producing this amount of finished products is anybody's guess. And the number of times each ton of raw material is handled while in process through the plant to finished product likewise might be any sort of guess. But, the chances are that to turn out forty-five million tons of finished agricultural chemicals, several times this amount of materials are processed and handled.

The trend toward mechanization in the field of agricultural chemicals during the past quarter-century has been part of the broader trend in all industry where large tonnages of materials are handled. Three main factors have been behind this trend, (1) the necessity to speed up operations to increase individual plant capacities to meet increased demand, (2) the need for holding down costs to meet competition in the face of steadily increasing wage rates, and (3) the impetus of war-time labor scarcities. High wages for common labor have probably been the greatest incentive to install labor-replacing equipment. Manufacturers have had little alternative, if they would meet competition, but to mechanize.

The day of the hand shovel, hand truck and wheelbarrow is not yet over by a long shot. But, so rapid has been the progress in replacing hand operations by labor-saving machines since the beginning of World War II ten years ago that this is the impression created. In many factories, hand labor still



Above . . . Conveyors can make use of plant space which might otherwise be wasted. A belt conveyor installation at Kelley Island by Stephens-Adamson Mfg. Co., Aurora, Ill. Below . . . Discharge end of a standard flat conveyor belt system for handling dry powdered materials. Equipment by Sprout-Waldron & Co., Muncy, Penna.



Opposite page . . . Portable conveying equipment loading fertilizer into boxcar. A unit of many uses in the agricultural chemical plant. Manufactured by Sprout-Waldron & Co., Muncy, Penna.

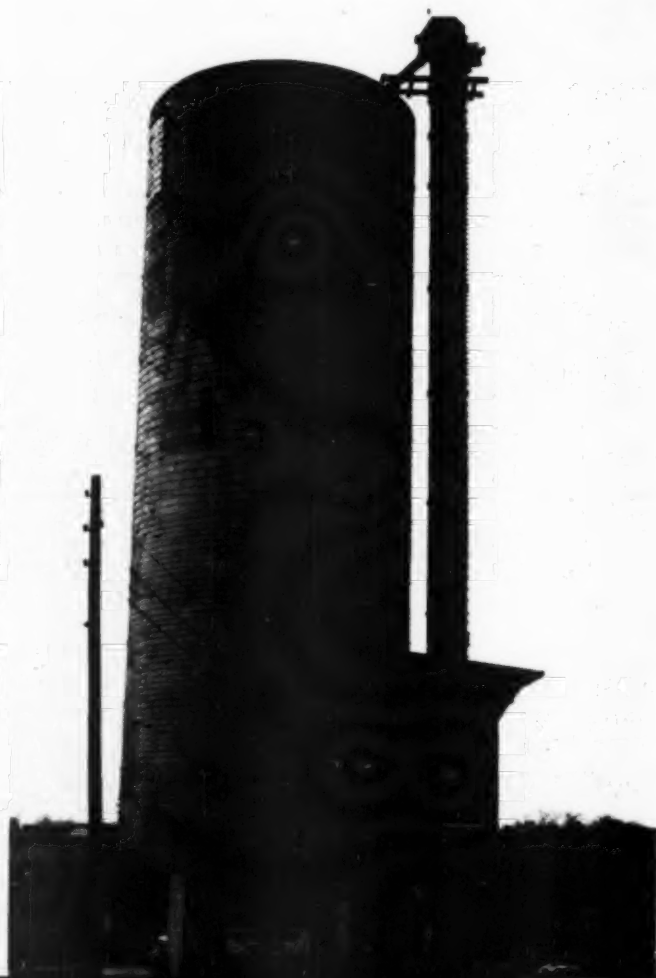
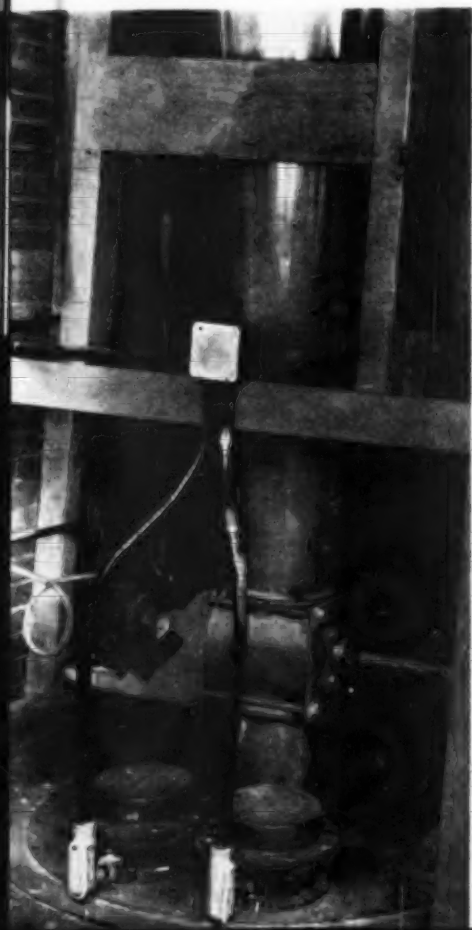


Below . . . Pneumatic conveying systems for dry powders are efficient and fast. Electric controls regulate intermittent flow of the materials to process or receiving bins. Equipment by Sprout-Waldron & Co., Muncy, Penna.

carries the bulk of the load. Not always is this the choice of management, but may be due to circumstances beyond its control. Lay-out and size of plant, kind of products manufactured and handled, and possibly financial considerations, all enter into such decisions. Nevertheless, material handling bottle-necks in this sort of manufacturing set-up cannot be anything but costly when all emphasis is on production as it has been, for example, for the past six or seven years.

Just the simple operation of unloading a bulk powdered material or transferring it in large ton-

Left . . . Battery of Draver feeders for automatic mixing, blending and conveying of powdered materials. Equipment by B. F. Gump Co., Chicago. Below . . . Receiving silo equipped with bucket elevator, standard modern fertilizer plant installation. Equipment by Baughman Mfg. Co., Jerseyville, Ill.





nages for a distance of 300 feet within a plant presents a good example. A motorized scoop operated by one man can take about 1000 to 2000 pounds of fertilizer and cover the 600 foot round trip about four times as fast as a man with a wheelbarrow, including loading of both. This means approximately the work

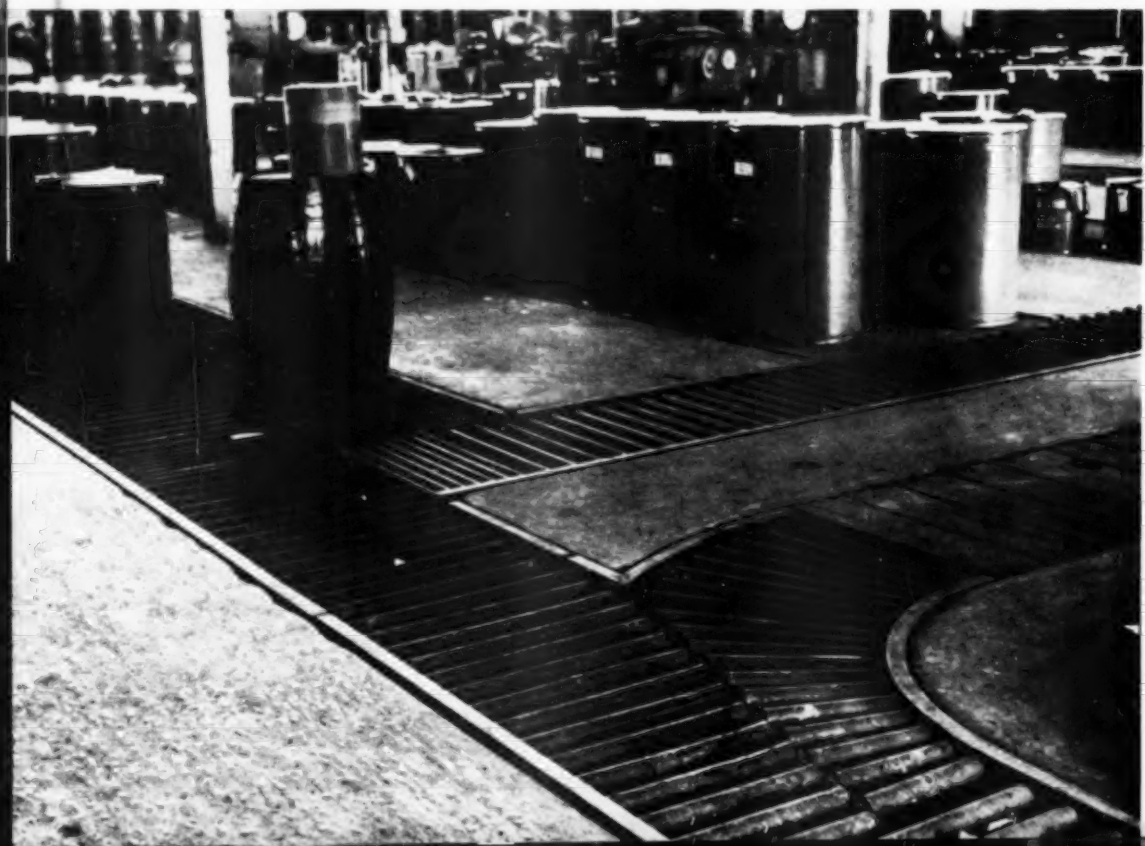
Above . . . Mining agricultural limestone 120 feet underground at Willingham-Little Stone Co., White-stone, Ga. with a Lorain Diesel powered  $\frac{3}{4}$  yard shovel. Below . . . A Baughman portable loader, a versatile "workhorse" in loading, unloading, and general handling of agricultural chemicals. Made by Baughman Mfg. Co., Jerseyville, Ill.

of twenty or more men with wheelbarrows. Loading or unloading by portable conveyors hooked up with regular plant belt or bucket systems reveal the same type picture.

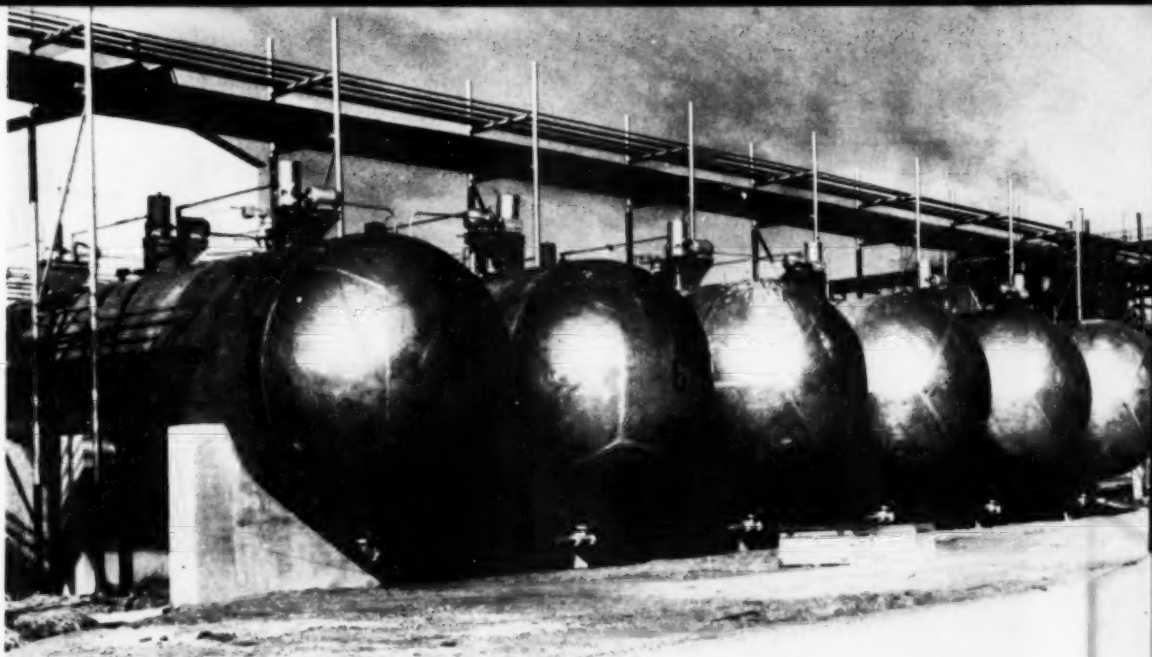
However, there is an important "but" in this and other mechanization. The plant must be large enough and the tonnage of material











Top left . . . Pulverizer, screen and bucket elevator installation for handling lime rock. Installation by Jeffrey Mfg. Co., Columbus, O. Lower left . . . Roller conveyor system for handling barrels, drums and cases in shipping department. Equipment by Logan Co., Louisville, Ky. Above . . . Handling nitrogen fertilizer solutions in the largest pressure vessels ever fabricated from aluminum. Photo at plant of Lion Oil Co. El Dorado, Arkansas.

handled must be sufficient to warrant use of such equipment a reasonable length of time each day or week. This has been the stock answer of operators of small units when mechanized handling installations have been suggested: "Our plant is too small and the amount of material handled does not warrant the cost of the equipment." Nevertheless, portable and otherwise adaptable small units of various kinds are rapidly making this argument obsolete.

The problems of material handling, even where just the field of agricultural chemicals alone is considered, are sufficiently wide and varied that they could comprise the subject for a book rather than a few pages. Just moving the materials from one place to another—not processing, not packaging, not storing—is the problem. Merely to get upwards of 45,000,000 tons of

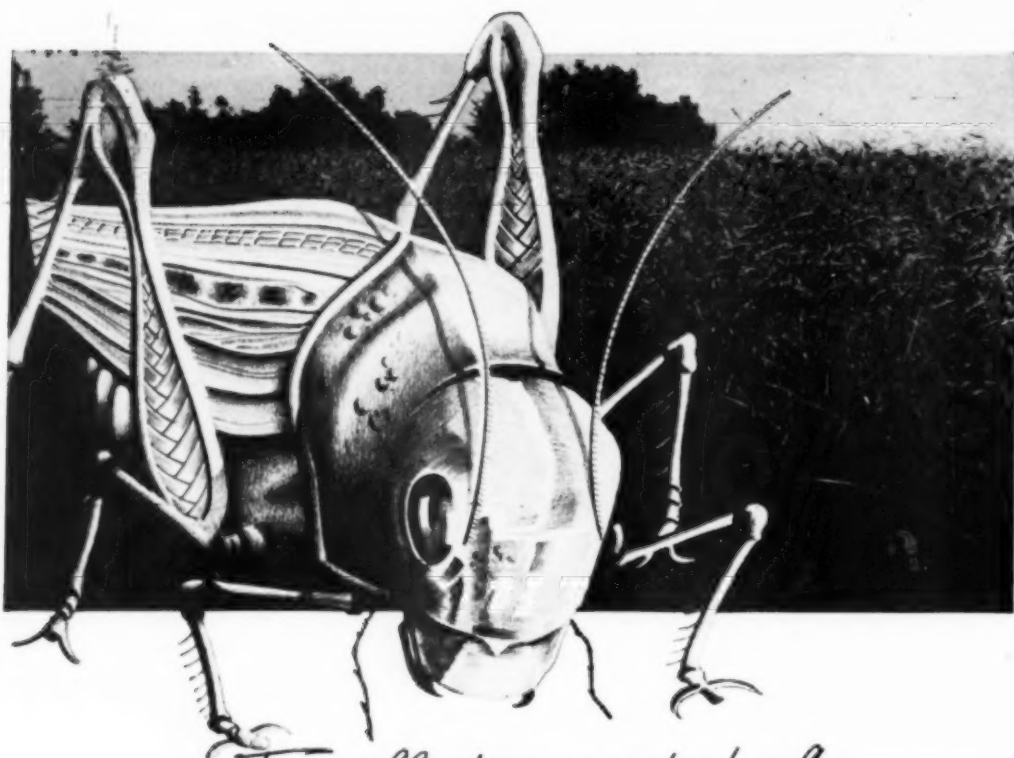
materials—mostly powdered and granular solids, but some liquids and gases as well—into the plant, through the process, and out in finished form is a man-sized job. It involves everything from tremendous bucket cranes, miles of belt and bucket elevators and conveyors, portable conveyors, trucks and motorized scoops of a dozen varieties, blowers and pneumatic systems to pipes, pumps, and valves of innumerable types. A dozen or so varieties of equipment have been chosen to illustrate here a few of the mechanized devices in common use today. There are still dozens more which might be shown.

On the whole, a steady movement toward wider mechanization of fertilizer, lime, insecticide, and allied plants has been accompanied by considerable redesign in plant lay-out particularly with a view to reducing the number of handling operations and removal of bottle-

necks. Improved earnings of the past few years have permitted expenditures for improved handling equipment in many plants which previously could not afford the outlay. Increased demand has warranted the new installations—in fact, made them vitally necessary—and put the entire fertilizer industry and allied agricultural chemical operations on a widely improved basis mechanically, resulting in a more efficient industry able to produce more and better products with greater economy. This trend toward mechanization, given strong impetus by war demands, continues on a broad scale.

The National Fertilizer Association, Washington, D. C., has announced a new type of service in the form of assistance to various areas in the production of agricultural motion pictures. It is pointed out that the service does not apply to individual states, but rather a group of states in a given area where the agricultural problems are similar.

The NFA is presently aiding in the production of a colored motion picture on the growing of hay, pasture and grass silage.



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**Talks, Application Equipment**

**Exhibit, Demonstrations Feature**

# Pennsylvania Weed Control Day

**O**VER 1200 farmers attended the second annual Pennsylvania Weed Control Field Day held at State College, Pa. on June 14. In addition to seeing at first-hand the results of weed-control research at Penn State, those in attendance heard discussions on various phases of practical weed control, and saw exhibits of the newest types of herbicides and application machinery.

On the speaking program George Berggren, Pennsylvania State College extension agronomist, and C. J. Noll, horticulturist, also of the State College, discussed the use of herbicides on field and vegetable crops. Dr. S. M. Raleigh, agronomist, talked on the control of wild garlic, and R. E. Patterson, agricultural engineer, gave a demonstration of spray nozzles and spray patterns. The latter two are likewise staff members of The Pennsylvania State College. Robert T. Beatty, of the American Chemical Paint Company, Ambler, Pa., dis-

cussed the control of woody plants, with special emphasis on brush killing.

Most of those in attendance took advantage of the opportunity to see the experimental work on weed control on the College farm. Guided bus tours made these inspection trips possible. Research work on quack grass control and brush killing appeared to be of particular interest to the group.

## Machinery on Exhibition

**A**PPPLICATION machinery was exhibited and demonstrated by the following companies: Accessories Manufacturing Company; John Bean Manufacturing Company; Dobbins Manufacturing Company; Engineering Equipment

Company; A. B. Farquhar Company; E. S. Gandrude Company; G. L. F. Farm Supplies; H. D. Hudson Manufacturing Company; F. R. Magill Company; McCune Company; New Holland Machine Company; Oberdorfer Foundries, Inc.; and Robert Reichard, Inc.

Several types of home-made weed sprayers built by engineers of the U. S. Department of Agricultural were also shown. Chemical weed killers were shown by American Chemical Paint Company; The Dow Chemical Company; E. I. du Pont de Nemours Company; G. L. F. Soil Building Service; Dr. Salsbury's Laboratories; The Sherwin Williams Company; State College Laboratories, Inc.; and Swift and Company.

The general chairman for the program was Dr. S. M. Raleigh, of Pennsylvania State College. He was assisted by Dr. D. E. H. Frear who took charge of the chemical exhibits, and R. E. Patterson, in charge of the machinery section.

**Below: General view of outdoor exhibition of herbicide application equipment at Pennsylvania Weed Control Demonstration day at State College, June 14. More than 1200 persons visited the campus for the occasion.**





**M**EETING at the Mt. Washington Hotel, Bretton Woods, N. H., the American Plant Food Council held its fourth annual convention June 19-22, with a record registration. A special train from New York was used to transport most of the attendants.

Clifton A. Woodrum, APF.C. president, opened the meeting proper on Monday morning, with an address pointing out that every citizen has a stake in preserving the private enterprise system. "The years immediately ahead will be critical for industry," he said, and emphasized that "every American citizen has a stake in the preservation of our private enterprise system and indifference inevitably leads to regimentation."

"Any student of current events must recognize a very definite trend towards bigger Government, more centralizing authority in Washington and more regimentation and regulation of Americans and American enterprise," he said. "These are times in which American citizens individually and collectively must be on guard and alert."

Mr. Woodrum paid tribute to the fertilizer industry which he said "has rendered outstanding service to American agriculture" and "has been responsive to the

#### APFC Board Members

New members elected to the board of directors of the American Plant Food Council were announced at the meeting. Each will serve for a three-year term. They are:

William C. Stark, Riverhead, N. Y.  
Luis R. Gonzalez, New York  
Joseph A. Howell, Richmond, Va.  
W. Hampton Logan, Charleston, S. C.  
Ashmead Pringle, Charleston, S. C.  
George E. Pettit, New York  
Walter Rupp, Baltimore, Md.  
John E. Sanford, Atlanta, Ga.  
Frank S. Washburn, New York

In addition to the above, J. A. Howell was elected chairman of the APFC executive committee.

results of technical and scientific study."

"The industry is progressive and alert," he said. "In a commendable way, it is meeting the phenomenal national and international demand for more plant

food. The industry is cooperating with farmers and their research and educational leaders in providing the kinds and quantities of fertilizer needed to meet the requirements of our wide variety of crops and soils.

"Industry is cognizant of its obligation to the American farmer and joins with him in support of the sound programs of all research and educational institutions. Industry hails the increasing consciousness that the fertility of our soils must be preserved. And in fact, the industry has made substantial contributions not only in maintaining but in increasing the fertility of the Nation's soils.

"New records of fertilizer production have been established with an average increase of about a million tons a year for the past 10 years and the fertilizer industry will continue to march abreast with the most progressive leaders in service to agriculture and the Nation."

An agricultural panel discussed "Fertilizer, Farming and the Future", following Mr. Woodrum's address. This panel, with Dr. Paul D. Sanders, editor of *Southern Planter* as moderator, included Dr. Robert F. Chandler, Jr., Director of the Agricultural Experiment Station, and Dean of the College

Photo above: APFC panel on "Fertilizer, Farming and the Future," (L to R) Clifton A. Woodrum (at microphone); Dr. Paul D. Sanders, moderator; Rep. Chas. B. Hoeven; Rep. Thomas G. Abernethy; Dr. Robert M. Salter; Dr. W. H. Pierre; Dr. Robert F. Chandler, Jr.; Dr. Ralph W. Cummings; and Dr. John R. Taylor.

of Agriculture, University of New Hampshire, Durham, N. H.; Dr. Ralph W. Cummings, Associate Director of the North Carolina Agricultural Experiment Station, Raleigh, N. C.; Representative Charles B. Hoeven, (Iowa), member of the House Committee on Agriculture; Dr. W. H. Pierre, Head of Iowa State College Department of Agronomy, Ames, Iowa; and Dr. Robert M. Salter, Chief, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Md.

Opening the panel discussion, Dr. Sanders credited fertilizer with playing an important role in maintaining a high standard of living in the U. S. "As the nation's farmers continue to produce bumper crops and take their toll of plant food from the soil, fertilizer will assume even greater importance in replenishing, maintaining and even increasing soil fertility", he declared.

"A significant tribute to the fertilizer industry is the confidence it has exhibited in its customers, the farmers, and the future of agriculture under an economy of abundance. While many of the 'long-haired', self-styled benefactors of farmers were busy urging the Government to enter further into the manufacture of plant foods, the manufacturers themselves were busy expanding their plants to satisfy the immediate

needs of farmers as well as their future requirements. Even today, the industry is continuing a program of expansion at a cost of millions of dollars—making huge investments which give ample testimony of their confidence in the future of farming.

"Looking further into farming's future, I hope that we have at long last realized in this country what the older civilizations, like China and India, have learned through tragic error: that a rich soil builds a rich civilization, that an impoverished soil means an impoverished people, that a nation cannot rise above its soil resources."

Dr. Chandler stated that the use of fertilizer materials to secure higher yields of quality forage crops and pastures in 12 northeastern states offers farmers assurance of lowering the cost of milk production. He asserted that the "real reason" for lack of any significant increases in hay yields in the northeastern states during the past decade has been failure to

manage hay and pasture lands efficiently. He emphasized that "there is adequate experimental evidence to show that these yields could be doubled to quadrupled by the liberal use of mineral fertilizers and lime."

Tracing the increase in per acre yields of potatoes in the Northeastern states from 75 bushels in 1889 to approximately 200 bushels last year, the New Hampshire research leader said that better varieties, use of improved insecticides and fungicides, use of land "best suited for the crop" were among contributing factors, but added that "barring certain variations caused by weather conditions, average yields parallel increases in fertilizer usage."

He described as "excellent" the future of farming in the Northeast, but emphasized: (1) "if real success is to be achieved, it can be done only by the use of modern and efficient methods"; (2) farmers "must continue to substitute intensive agriculture for the more extensive type"; (3) "quality must continue to be foremost if we are to maintain our markets" and (4) "labor saving equipment and fertilizers must be used intelligently."

Dr. Cummings, appearing as third speaker on the panel, pointed out the role of fertilizer materials in the southeastern states. He described as being "very limited",

Below, first photo, (L to R), R. F. Camp, vice-president, Chilean Nitrate Sales Corp., New York; and G. Tracy Cunningham, Ass't. General Sales Manager, Armour Fertilizer Works, Atlanta.

Second photo: J. F. Benton, Raymond Pulverizer Division, Combustion Engineering Co., Chicago; and Frank S. Washburn, American Cyanamid Co., New York.

(Photos courtesy American Plant Food Council)





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the areas in the southeast where a stable agriculture may be maintained without systematic use of fertilizers. "Plant Foods must play a major role" in future farming development, he said. To qualify this statement, he said that the agriculture of the south is uniquely dependent on the use of fertilizers. "Its soils are *not* noted for their fertility in the virgin state. The climate, characterized by a relatively high and well-distributed rainfall, warm temperatures and a long frost-free season, is in itself favorable to the production of many farm crops but is one which promotes rapid weathering of the soil materials and the depletion of plant food by leaching.

"Fertilizers not only are essential in producing high yields but actually determine what crops can be grown successfully in the region. Without them, few of our present crops in the Southeast could be grown successfully at all.

"North Carolina has been leading the Nation in tonnage of commercial fertilizers used. This state ranks third in cash return from crops. However, of its 18,600,000 acres in farms, only about 40 percent is classed as crop land. The three major cash crops—tobacco, cotton, and peanuts—together occupy only about 20 percent of the crop land or less than 9 percent of the total farm land. Two of these crops—tobacco and cotton—are heavy users of fertilizers. The opportunities for further agri-

Top photo, (L to R), Rep. Harold D. Cooley; Mrs. J. D. Stewart, Geo. E. Pettit; Miss Martha Ann Woodrum and J. D. Stewart, Jr.

Second photo: Dr. Robert F. Chandler, Jr.; George Serviss, G.L.F., Ithaca, N. Y.; and Dr. Wm. I. Myers.

Third photo: Fred J. Woods, Tampa, Fla.; J. D. Stewart, Jr., Louisville, Ky.; and Ray C. Ellis, New Albany, Ind.

Fourth photo: W. E. Barret, Richmond Guano Co.; George G. Osborne, and A. Lynn Ivey, secretary and president, respectively, Virginia-Carolina Chemical Co., Richmond, Va.

Lower photo: Oscar F. Smith, president, Smith-Douglass Co., Inc., Norfolk, Va.; and J. Albert Woods, president, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.

(Photos courtesy American Plant Food Council)



cultural development in this area are very considerable. And in its agricultural development, fertilizers must play a major role. The situation in North Carolina has its parallel in most of the other Southeastern states. This is truly a land of opportunity, for farmers and the fertilizer industry alike."

Representative Hoeven, in discussing the dangers inherent in the Government's entrance into business competitively, stated that the United States can go down the road either to the socialism of Britain or the statism of Russia if we put the government in business.

"The American farm is said to represent the last stronghold of the competitive free enterprise system as we have always known it in this country", he said. "The farmer is still a man who likes to run his own business without unnecessary interference from Washington. Utopian plans for the welfare of agriculture are being presented to him almost daily and he regards them somewhat with suspicion. If the American farmer is to continue as the champion of our private enterprise system, we must make that system work before his very eyes. We cannot take anything for granted."

Rep. Hoeven paid tribute to the fertilizer industry which he said "has done a good job" and "its work should be encouraged."

"The plant food industry must keep the good will of the farmer in producing the supply of fertilizer he needs," he added. "It can be done if our free enterprise system is permitted to carry on without the further interference and encroachment of government. When the American farmer sees that private enterprise is fulfilling his needs and is doing a better job than the government could do, he surely is going to remain on the side of private enterprise where he traditionally and conscientiously belongs. In the last analysis, the American farmer wants to be counted on the side of free enterprise which has made America the greatest industrial nation in the world."

"Most Americans are not in favor of putting the Federal Government in business in time of peace. So the average taxpayer, including the farmer, does not like to use the taxpayers' money to finance the construction, maintenance, and operation of fertilizer manufacturing plants when private industry is anxious and willing to increase the production of

essential and badly needed fertilizer. Such plants are in direct competition with private industry. Those of us who are interested in the welfare of agriculture are in favor of more, better, and cheaper fertilizer but, at the same time, we are most anxious for private industry to have an opportunity to function and to perform to the utmost of its capacity. Once we break away from the basic and fundamental principle of free private enterprise, it will be easier to do so again to the detriment of other industries."

That the north central states should be using more fertilizer materials if soil fertility is to be maintained, was stated by Dr. Pierre in his part of the panel discussion. He declared that in his State of Iowa alone, "the amounts of fertilizer used at present should be more than tripled."

Analyzing a 422-per cent increase in use of fertilizers in the North Central States last season compared with 1935-39, Dr. Pierre said that advances in farming technology "would have little effect" if farmers were not convinced that "fertilizer use is profitable."

"Farmers in the mid-west are more interested in soil conservation and more aware of the importance of high level soil fertility for efficient crop production

Turn to page 73

Photos below: Fred J. Woods, Tampa, Fla., in first photo, with Joseph A. Howell, executive vice-president, Virginia-Carolina Chemical Co., Richmond, Va. Second picture: Mrs. J. M. Rawlings; George W. Gage, president, Anderson Fertilizer Co., Inc., Anderson, S. C.; Mrs. W. T. Wright and J. M. Rawlings, F. S. Royster Guano Co., Norfolk, Va.

(Photos courtesy American Plant Food Council)



Western Shade Tree Conference Hears Discussion  
on various means of application and role of

# Chemicals vs Plant Disease

by  
Dr. Alvin J. Cox

**T**HE 16th Annual Meeting of the Western Chapter of the National Shade Tree Conference was held May 25-28 at the El Rancho Hotel, Sacramento, Calif. More than 150 were registered for the event. Officers elected for the ensuing year were: President, C. E. Lee, So. California Edison Co., Alhambra; vice-president, Victor Anderson, Superintendent of Parks, Stockton, Calif.; secretary-treasurer, Aaron L. Olmsted, Division of Highways, Los Angeles. The former president was Horace N. Bosworth, Sacramento.

A thorough discussion of plant pests and diseases of shade trees and ornamentals was held on the morning of May 26th, under the chairmanship of Prof. Pierre A. Miller, Division of Plant Pathology, University of California, Los Angeles.

Laurel G. Smith, entomologist, Shell Chemical Corp., San Francisco, discussed the low-volume application of a number of the newer insecticides. He said that one of the earliest uses of petroleum oil as an insecticide was in control of scale insects on citrus. Since that time, extensive research by both industry and Federal and State agencies has brought developments which have resulted in placing oil among the most-used insecticides. An estimated 25,000,000 gallons of oil are used annually as horticultural sprays alone, throughout the world, he said.

Mr. Smith continued by remind-

ing that entomologists find themselves confronted with numerous new chemicals, each of which may be very effective against certain insects even when applied at low dosage per acre. These advancements make it possible to expand the application of insecticides as low volume sprays, or concentrate sprays, vapor sprays or mist sprays. However, low volume application of insecticides is not a new method of insect control, he stated. Oils containing added toxicants have been used for a number of years as vapo sprays, he said, and as an example, he cited oil containing pyrethrum for control of grape leaf hopper on grapes, beat leaf-hopper on sugar beets; oils containing rotenone for control of cabbage worms and aphids on cole crops and pea aphids on peas; and dormant oils applied to prune trees for control of mites and aphids.

At the present time, insecticides in the form of vapo sprays are being used on practically every major type of crop, including tree fruits, field and vegetable crops, and forest and shade trees, Mr. Smith said. Airplanes and helicopters are equipped with spray booms or rotary brushes or discs which break up the liquid into fine droplets and project these droplets into the air stream. In the case of ground equipment, the materials are broken up into fine droplets as they are injected under pressure into the airstream created by rotary fans and turbines. In both

types therefore, large volumes of air instead of water carry the pesticides to plants.

Low volume sprays are usually considered to be those sprays in which an amount of toxicant equivalent to the amount which is used in bulk sprays is diluted with a few gallons of oil or water, and applied at a low gallonage per acre. Therefore, one method in formulation is first to determine the amount of toxicant normally applied per acre (or per tree) in bulk sprays, and then dilute this with sufficient carrier to give the required coverage and deposit.

He then enumerated the four types of low volume sprays:

1. Petroleum spray oils applied undiluted or as a low volume emulsion.
2. Insecticides dissolved in oil, and oil used as a diluent or carrier (no water).
3. Insecticide concentrate usually solubilized in petroleum solvents with an oil soluble emulsifier, for use as a low volume emulsion.
4. Insecticides or fungicides in form of wettable powders, or powders plus wetting agents, spreaders and stickers in water.

Progress to date in the development of low volume sprays and their application indicates that this method is adaptable to control of many pests which occur on shade trees of the Pacific Coast, and the method has many advantages over conventional spraying for control of shade tree leaf feeding insects, such as tussock moth,

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## Current Information . . .

Time is the essence of a worthwhile information service. . . . Appreciating this, NAC issues weekly bulletins on insect and blight development to its members. . . . These are made available to the Association through cooperation of agencies of the United States Department of Agriculture.

By means of these reports it is possible for members to estimate the requirements of an area, provide for anticipated chemical needs and effectively route the supplies.

This is but one of many bulletins issued by NAC for the protection and information of its membership. . . . Last year more than 450 timely bulletins of all types were issued.



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fall webworm, eastern tent caterpillar, forest tent caterpillar, cankerworms, elm leaf beetles and lace bugs on oak and sycamore in the eastern part of the U. S.; and control in California of such insects as oak worm, various species of tent caterpillars and tussock moths and oak looper.

Mr. Smith stated that low volume, vapor or mist sprays offer considerable promise for control of a number of pests occurring in shade and ornamental trees in the Pacific area, and should supplement conventional spraying. Where this can be done, their use has advantages over conventional spraying due to more rapid application, lower operational labor cost, lower capital investment in equipment and lower materials cost.

A paper by John B. Steinweden, Entomologist, California Department of Agriculture, Sacramento, entitled, "Notes on Some Important California Shade Tree Insect Pests and Their Control", was read by Stewart Lockwood. The author called attention to the great number of insects that live on shade trees, and pointed out that just now members of the staff and graduate students at the University of California are working on the control of insects on ornamental plants.

With the advent of DDT and the many other new insecticides most of the old ones passed out of the picture, the paper said. Two proper sprayings of DDT will usually control codling moth in apples better and cheaper than the former 4 to 14 sprayings of lead arsenate. Most species of thrips are easily controlled by DDT and it is possible in this manner to control onion thrips on avocado, English laurel, rhododendron and azalea; also the ash mirid, lygus bug and soldier bug, the author declared.

However, careless and widespread use of organic insecticides may destroy beneficial insects, upset biological control and by killing off predators, result in an increase



of red spider mites, woolly aphid, etc., the paper warned. He suggested as a solution, the establishment of insectaries for production of natural enemies of harmful pests.

He spoke especially about the trees of the central valley streets and highways, namely oak, plane or sycamore, Arizona ash, elm and maple. Injury to the live oak by the California oak caterpillar runs in cycles. Lead arsenate and DDT are used against the caterpillar, but the former does not reduce beneficial parasites. He furnished important detailed information with regard to controlling pests on shade trees and ornamental shrubs that have been planted extensively all over California.

The paper by D. G. Milbrath, Chief, Bureau of Plant Pathology, State of California Department of Agriculture, entitled, "Potential New Diseases of Shade Trees in California", was read by Gilbert L. Stout. As the title indicates, one of the objects of the Bureau is to prevent introduction of plant diseases not yet in California, or at least to intercept and check spread of diseases before they do any great harm. Sometimes a disease is present a long time before it is discovered. Young nursery stock may not show a disease and yet allow it to spread to older trees; so it may be difficult to find the tree that introduced the disease.

Above (L to R): Horace N. Bosworth, Shade Tree Conference president 1948-49; Aaron L. Olmstead, newly-elected secretary-treasurer of the Conference; and C. E. Lee, newly-elected president for 1949-50. Mr. Lee was formerly secretary-treasurer.

Both state and federal governments have quarantines in operation to prevent introduction of new plant diseases. For example in July 1947, the State of California issued a quarantine proclamation forbidding entry from 25 states, of all elm plants, except seed. The ban covers other states because of Dutch elm disease from a fungus, and phloem necrosis of elm, a virus disease.

The Federal government has in reality established three classes of plants, namely, those which are permitted entry without restrictions, those which are completely prohibited because of certain diseases, and those which are permitted to enter under certain post-entry restrictions. The strongest regulations are not an impervious wall against the introduction of undesirable plant pests. Holding is largely to determine if disease is present in obscure condition such as virus. Some plants which are entirely without symptom, are tolerant carriers of virus and may spread disease into new areas. Virus diseases of orchard, fruit and nut trees have been known for quite a number of years. There are 40 known virus diseases in the group of fruits comprising apri-



# NOW\*

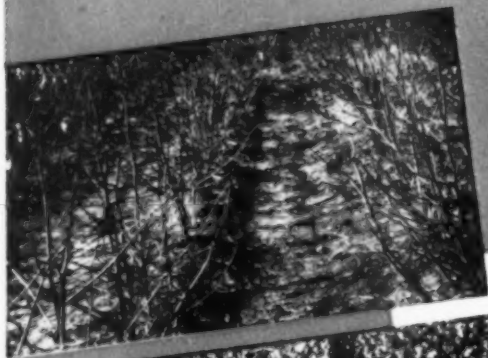
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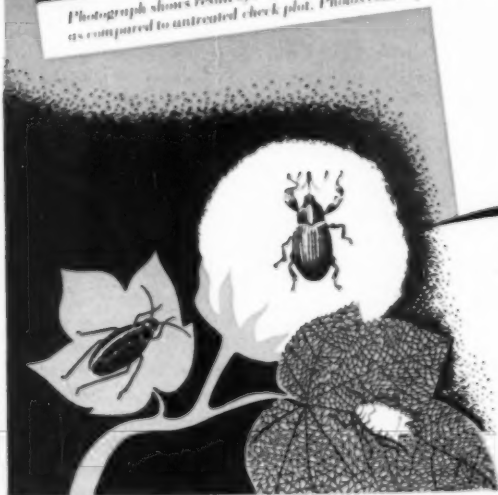
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### \*WARNING:

This year, due to a mild winter, more overwintering boll weevils have been found in surface trash than ever before at the U. S. Department of Agriculture's experiment stations at Florence, S. C., and Tallulah, Louisiana. This means that if weather conditions are favorable in June, cotton farmers can expect severe infestations of boll weevils! Stress this to your customers!



cot, peach, almond, cherry and plum. Gradually the presence of virus diseases in ornamental and shade trees is becoming known, and some may be destructive.

### Weed Killers

The afternoon of May 26 was devoted to "The Chemistry of Weed Killers". Professor A. S. Crafts, Department of Botany, University of California and the Experiment Station, Davis, in his talk, reported that 7 million acres of wheat were sprayed with herbicides last year in Canada. In one instance, a section of land was sprayed in 45 minutes by 2 planes. But fast application is not the end of problems. To do a thorough job, one has to know something of chemistry. Professor Crafts pointed out. He classified herbicides into three general groups: (1) *Contact*, which may be selective herbicides in oils or aqueous, or general, which may be preplanting, post-planting or aquatic herbicides in oil, water or emulsions; (2) *Translocated*, which may be hormone-like or non-hormone herbicides; and (3) *Soil Sterilants*, which may be temporary, either pre-emergence or post-emergence, or they may be permanent.

Professor Crafts said that selective herbicides, which are those that kill weeds without injury to the crop, are the ones in which most interest lies. Selective herbicides depend for their effectiveness on (1) differential wetting; (2) morphological differentiation or selectivity, as for example eliminating dandelions from bluegrass; (3) biochemical selectivity, as for example, iron sulphate kills mustard and not wheat, or oil kills weeds and not carrots but 2,4-D is not differentially selective; (4) selective spray placement; (5) selective soil sterilization; and (6) differential growth habit, for example, before the alfalfa growing season weeds may be eliminated from it by using fortified oil (where one plant is dormant). Prof. Crafts concluded.

Numerous other speakers appeared on the program at various times. These included Mayor Belle Coolidge of Sacramento; Thomas H. Dennis, Principal Highway Engineer, California State Division of Highways; Prof. Woodbridge Metcalf, Extension Forester, University of California and U.S.D.A.; Dr. Gilbert W. Scott, geneticist, Associated Seed Growers, Inc., Sacramento; John W. Duffield, geneticist of the U. S. Forest Service Institute of Forest Genetics, Placerville, Calif.; Ray Hartman, president, Leonard Coates Nursery, San Jose, Calif.; Leslie Mayne, California Arborists Ass'n.; Peter Riedel, Park Department, City of Santa Barbara, Calif.; Ernest Higgins, landscape architect, Berkeley, Calif.; Brian O. Mulligan, Director, University of Washington Arboretum; and Maunsell Van Rensselaer, director, Santa Barbara Botanic Garden.

Norman Armstrong, White Plains, New York, president of the National Shade Tree Conference, was the guest speaker at dinner on May 26, and Prof. Howard E. McMinn, Department of Botany, Mills College, Oakland, Calif., spoke at a luncheon on May 27.

On the afternoon of the 27th, the group inspected the parks of Sacramento, visited a number of historic places, the city-owned Garden Center, and some of the residential districts of the city. Another group witnessed demonstrations of commercial equipment for spraying trees and ornamentals.

The meeting closed with the installation of new officers and a banquet at Hotel Senator, Sacramento. It was voted to hold the 1950 meeting at Long Beach, Calif.

### U.S.D.A. Bulletins Issued

Recent Bulletins issued by the U. S. Department of Agriculture include "The New Insecticides for Controlling External Parasites of Livestock" (E-762 Revised); and "Tests of Insecticides for Grasshopper Control, 1947", (E-774).

The first, prepared by the Division of Insects Affecting Man and Animals, summarizes the results of research to date, and compares the performance of different materials against various insect pests. It also summarizes the available knowledge regarding the toxicity and potential hazards of the materials to man and animals, and recommends restrictions and specific uses for the new materials including DDT.

The second, compiled by Dr. J. R. Parker of the Division of Cereal and Forage Insect Investigations, describes tests with sprays and dusts of chlordane, toxaphene, BHC, HETP, and parathion. The results of tests with wet and dry baits are also described. Tables are presented giving summaries of field tests with different materials in Arizona, Montana and California.

Copies are available from the U.S. Department of Agriculture, Washington 25, D.C.

### Conn. Report on Pure Food

A summarization of food examinations has been published by the Connecticut Agricultural Experiment Station, reporting the findings of the Dairy and Food Commissioner, the Food and Drug Commissioner and the Commissioner of Farms and Markets of Connecticut.

Sixteen hundred and seventy samples of foods, drugs, cosmetics and related materials were examined during the year, the report states. Of these, 587 were adulterated or misbranded. These samples do not reflect the standards of most food and drug products being sold in the state, the report points out, since these samples were submitted on suspicion of violating the Pure Food and Drug Laws.

Two hundred and eighty-seven samples of miscellaneous foods were submitted by the Commissioner because of rodent or insect contamination or the presence of foreign matter, or because the foods had made people ill.

# Experiment Station Digest

By H. H. Slawson

**M**ANY new developments of interest to insecticide manufacturers are reported in the first few annual reports for 1948 released by a number of agricultural experiment stations.

At the Geneva, N. Y., station a method was developed for evaluating the effectiveness of fungicidal applications in orchards with particular bearing on the practicality of airplane spraying.

Assistant Professor G. L. Mack of the department of chemistry, has developed a test for detecting copper on leaves, through the use of two filter papers impregnated with ammonia and dithio oxamid, between which a leaf is pressed. This produces an exact pattern of the copper deposit on the paper in an intensely colored form. Prints can be made rapidly with simple equipment in the field to form a permanent record, showing the pattern in which the copper particles are spread on the surface.

Deposit ratings are determined by the relative depth of color on the prints. These give a quantitative estimate of the individual deposit ratings. Statistical analysis of the individual deposit then yields a numerical test of the uniformity of deposition over the whole plant.

The report presents one comparison between aircraft dust applicators (airplane and helicopter) and ground sprayers, which indicates that the ground sprayers were more effective. Disease control and yield data also showed a good correlation with the distribution and penetration of the fungicide into the plant, as determined by the leaf print test on upper and lower leaf surfaces at various locations on the plant.

Using petroleum spray oil, the Geneva investigators studied the effect of oil on the respiratory activity of eggs of oil-susceptible

insect pests. This oil, it was determined, causes a marked reduction in respiration rate, ultimately destroying the viability of the eggs. No definite point of death was observed, but data obtained show that the oil must be present approximately 24 hours to prevent hatching. Highly volatile products, it was concluded, may be ineffective as ovicides.

Some evidence was also obtained to indicate that the insect eggs produce a toxic gaseous substance which is not readily eliminated when a film of oil is present in the egg chorion. This preliminary observation, it was thought, may prove to be intimately related to the killing effect of the oil. The report also adds that findings thus far have suggested ways of improving the insecticidal effectiveness of petroleum oil sprays.

The Vermont station at Burlington reports a search for new materials from plants that may prove to be valuable as fungicides. About 75 extracts of green plants were tested for activity against organisms causing plant diseases and one extract of garden balsam, which proved very promising, has been synthesized. This is described as closely related to the commercial fungicide "Phygon," but, as it is found in a plant, the investigators regard it as being perhaps less toxic to plants which are being treated.

Significant conclusions were reached through chemical thinning tests in apple orchards, conducted by the Massachusetts station at Amherst. Using "App-L-Set" (the sodium salt of naphthalene acetic acid) at 16 to 20 ounces per 100 gallons of spray, the thinning test was conducted on three varieties of apples four weeks after calyx. Results indicated that chemical thinning can be conducted at this late

date. The report comments further, that a treatment that can be made as late as four weeks after calyx has a distinct advantage over bloom or calyx applications, since the extent of fruit setting and the necessity for thinning can be determined rather accurately by this time.

Amherst investigators settled a question raised by tobacco growers whose seedbeds were almost total failures following soil sterilization with chloropicrin. Growers blamed their losses on the chemical which had not evaporated because of the low soil temperature which followed its application. After detailing the tests made, the report states: "Chloropicrin, although applied late in the season, was apparently not the cause of the seedbed failure in the trial. This failure was attributed to the effects of the spring application of fertilizers. It is believed that tobacco seed beds should be fertilized in the fall, or at least a considerable time before the seeding, if the fertilizer is applied in the spring."

At Amherst, analyses were made of grasses onto which DDT dripped and drifted after being sprayed on elm trees in pasture areas for control of elm bark beetles. DDT (technical grade) had been used at rates of 16 and 8 pounds per 100 gallons and as much as 25 gallons of spray were applied per tree. Four days after an August application, with 0.52 inches of rainfall, the residue on the grass was 6,885 p.p.m. DDT from the 16 pound application, and 4065 p.p.m. from the 8-pound application. After 68 days, with 4.55 inches of rainfall, the corresponding residues were 1,658 and 851 p.p.m.

Some 96 days after an April application, with 11.63 inches of rainfall, the residue from the 16-pound spraying was 43 p.p.m. and from the 8-pound application it was 45 to 50 p.p.m. The residue was determined by the total chlorine method and based on the oven-dry weight of the grass.

"Such high DDT residues," comments the report, "would seem to be undesirable and possibly hazard-

ous where food for man or animals is involved." More detailed studies are in progress, it adds.

Idaho Experiment Station at Moscow, Ida., reports a new use for BHC to control hog mange for which no satisfactory control was previously known. One application of 20 lbs. of BHC (10 percent gamma isomer content) in 100 gallons of water does an effective job, the investigators discovered, although in some instances a second application may be required for heavily infested animals. The BHC sprays are also being recommended for hog lice and the report adds that "This should simplify the swine parasite problem in Idaho."

Using 2,4-D for selective weed control in wheat fields, Idaho experimenters discovered that this compound can increase the protein content of wheat. Chemical analyses of 58 samples of wheat showed marked increase in percent of protein after use of the 2,4-D and the report discusses the possibility that this chemical can be used to produce wheat whose protein content can be "tailored" to meet millers' requirements more closely.

Idaho station reports a possible use of 2,4-D to aid in production of lettuce seed from hard-headed varieties. Heretofore it has been necessary always to slash a break over the heads to permit release of the seed stalk, an operation which adds appreciably to seed production costs.

Preliminary experiments indicated that a weak solution of 2,4-D sprayed on the head at a critical time will not kill the plant, but causes a downward bending of leaves which prevents heading and permits the seed stalk to develop freely. Further investigations are to be made before the practice is recommended for commercial use.

Colorado station at Fort Collins, in reporting on weed control tests in sugar beet fields, states that "Chemical treatments in some cases show promise but are expensive and are exacting as to time and conditions of application."

In laboratory tests at Fort Col-

lins ultra-violet light was found to increase the activity of several 2,4-D compounds. Another section of the report calls attention to the general assumption that the ester form of 2,4-D is generally more effective than the amine and sodium salts of this weedicide.

"Results at this station," says the report, "do not clearly indicate such to be the case, but they do indicate a greater danger of reducing yields in grain when the ester is applied at too high rates or at the wrong time."

In a study of the fundamental action of 2,4-D compounds, it was found at Fort Collins that new growth regulating compounds, applied to Triumph and Pawnee potatoes improved their cooking qualities. Low concentration of three compounds increased specific gravity and viscosity of potatoes and resulted in greater whiteness on cooking. Color of Bliss Triumphs was also improved by hormone treatment.

Using chlordane (Velsicol 1068) the Colorado workers killed mound building prairie ants within 14 days. Spray was applied on each nest at the rate of 300 cubic centimeters of 3 percent suspension or emulsion in water. Other quantities failed to give good results. Spray was applied directly into the entrance of the nest by pushing the nozzle back and forth throughout the mound and by spraying half the material into the entrance and the remainder into a hole made into the top of the mound. Pouring the liquid in failed to give uniform results. Chlordane dusts also failed to give good kills. Other chemicals used killed large numbers of ants but did not destroy the colonies.

South Dakota station at Brookings reports on a project to determine how much 2,4-D is required to kill noxious weeds and another on whether 2,4-D can be used safely on barley and oats. Recommended methods were worked out for controlling insect pests of shelter belts and research work is reported on grasshopper control with either

chlordane or toxaphene. South Dakota's area treatment program for control of heel fly on beef cattle is also detailed at some length. Some 10,300 head of cattle were treated by 115 operators under station guidance. Sprayed animals showed a gain of 0.24 pounds per day over untreated animals.

New Mexico station at State College, N. M., reports that in tests with 2,4-D for weed control the most satisfactory preparations, from a cost standpoint, were the sodium salt forms. However, the esters were used with no crop damage. Farmers are advised that land to be used for either alfalfa or cotton should not be sprayed with 2,4-D and that this chemical should never be used in the vicinity of cotton.

"At a distance of 800 feet," says the report, "cotton was injured by 2,4-D ester, which had volatilized and drifted to the field. One third pound of parent acid, applied 200 to 400 feet away from a cotton field, severely damaged the cotton."

Using 2,4-D, efforts were made to control mesquite which invades New Mexico ranges, but results were erratic. Some methods were promising enough, however, to warrant further work, it was announced.

#### N.E. Phytopaths to Tour

Dr. D. H. Palmiter, Hudson Valley Fruit Investigation Laboratories, Poughkeepsie, N. Y., has announced that the summer tour and meeting of the Northeastern Division of the American Phytopathological Society is tentatively set for early in September. The tour will start at New Brunswick, N. J. and will continue through southern New Jersey by bus. The group will inspect disease control of fruit and vegetable areas.

Although there will be a short business meeting, there will be no formal speakers nor presentation of papers, Dr. Palmiter says. Further details will be announced in next month's issue.

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AGRICULTURAL CHEMICALS

# The Listening Post

## Insect Conditions Late May, Early June



This column, reviewing current insect control programs, is a regular feature of **AGRICULTURAL CHEMICALS**. Mr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

**P**UPATION by the European corn borer was nearly complete by the middle of June in practically all parts of the infested area, with the exception of Minnesota and New York. Ninety percent or more of the moths had emerged by that time throughout the southern part of the area and in the Atlantic coast states. In the northern states emergence was progressing more slowly. Reports for the week ended June 4 indicated that egg laying had been observed in all reporting eastern states except Maine and that treatment schedules had been started in New Jersey. Egg loads at that time in counties in Kentucky, New York, Maryland and Ohio were sufficiently great or approaching numbers high enough to warrant treatment of sweet corn. There was a great increase in oviposition during the week ended June 11. In some of the mid-western states the degree of egg deposition gave indications of high infestation.

As of the middle of June, due to drought and other factors, the extent of the area infested by grasshoppers and the intensity of the infestation in western and mid-western states was exceeding earlier expectations. Bait has been applied to some 140,000 acres of range land in the major outbreak area in Montana and Wyoming, and excellent kills reported. The States, Counties, other political

subdivisions, and many ranchers are participating with the Federal Government in the cooperative grasshopper control program. Farmers in other areas where grasshoppers threaten are alert to the seriousness of the situation and are taking steps necessary to protect their own crops.

Boll weevils emerging from hibernation in large numbers reached cotton fields in May. Reports from North Carolina, South Carolina, Mississippi and Louisiana indicate a greater abundance of weevils than last year. In most areas of Georgia, Alabama, Texas and Oklahoma they appear to be about as numerous as a year ago, although they are somewhat more abundant in some parts of those states. Few weevils have been reported from the Lower Rio Grande Valley of Texas where all cotton stalks were destroyed last August. No cotton leafworms had been found in any areas as of the middle of June.

Infestations of the Mexican bean beetle continued generally light to moderate during the last half of May and the first half of June. Heavy infestations were reported toward the middle of June on Long Island, New York and in parts of Prince Georges County, Maryland. Populations of the bean leaf beetle were generally light to moderate, except in eastern Virginia where some damage was reported during the last half of May. Damage to

beans by the seed-corn maggot was reported during late May and early June from widely separated districts of New York, Minnesota, central Washington, and southern California. Moderate infestations of the potato leafhopper were reported on beans during early June in southern Florida and New Jersey, with lighter infestations present in Tennessee. Other pests reported injuring beans during the first half of June included the sugar-beet wireworm and cutworms in southern California, wireworms in southern Idaho, the spotted cucumber beetle in Virginia, the southern green stink bug in South Carolina, and grasshoppers in central Washington.

Cabbage caterpillar populations continued light to moderate on cole crops in all areas reporting, except in southern California where serious damage was reported in some fields due to the cabbage looper. Aphid populations on crucifers appeared to be generally low except in southern California, where some damage occurred, and in Minnesota, where the cabbage aphid was injuring cabbage late in May. The cabbage maggot was abundant in New York and in western Washington around the first of June, with lighter populations reported from North Carolina and New Jersey. The cabbage seedpod weevil was very abundant in 3 counties of west central Idaho during the last half of May and early June. The harlequin bug was abundant on cabbage and turnip in Tennessee shortly after mid-May, with lighter infestations reported from South Carolina. This insect was injuring turnips in Georgia early in June. Toward the end of May both adults and larvae of the yellow-margined leaf beetle were collected on turnips in George County in southeastern Mississippi. Heavy infestations of this insect were said to have been observed in gardens in Jackson and George Counties. Damage by this insect to mustard and turnip in Mobile County, Alabama, was on the decrease by early June.





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The Colorado potato beetle was reported damaging potatoes, tomatoes and eggplant throughout the East and in Tennessee during the last half of May. This insect caused serious injury to tomatoes in the Piedmont section of South Carolina early in June. Toward the middle of that month infestations were reported moderate to heavy on potatoes, and in some instances on tomatoes, in New York, New Jersey, Delaware, and Virginia.

Onion thrips infestations continued severe in a number of areas during the last half of May, especially in Virginia, Georgia, Tennessee, and California. The situation was still serious in Virginia and Tennessee toward the middle of June. Severe infestations of the onion maggot were reported at that time in New York, New Jersey, Utah, and Idaho.

The potato psyllid was unusually abundant during the first half of June on potatoes and tomatoes in Nebraska, Colorado, and Wyoming. Tuber flea beetles also occurred in moderate numbers in parts of those States.

Populations of the pea aphid and the pea weevil have remained relatively low in all districts from which reports were received. However, toward the middle of June, the pea aphid appeared to be on the increase in Wisconsin, Tennessee, and Utah. Also, at that time the pea weevil was becoming more destructive than anticipated in New York and populations in Utah had become more abundant than in 1948.

In Georgia and Florida the attacks of aphids on shade-grown tobacco have been kept generally well under control, but varying degrees of infestation have persisted in some fields of flue-cured tobacco. Light infestations of aphids on tobacco were reported from Maryland toward the end of May and heavy infestations were reported at that time in Greenville County, Virginia. Aphid infestations began to appear on tobacco plants in the field in northwestern Tennessee

toward the middle of June. They were causing serious injury by that time in some South Carolina tobacco fields, while in central North Carolina, aphid populations on tobacco were light to moderate, though widely distributed. Hornworms and the tobacco budworm occurred on tobacco in light to moderate numbers in South Carolina, Georgia, and Florida toward the middle of June. The tobacco flea beetle was unusually abundant and destructive at that time on young tobacco plants in Tennessee.

Development of the codling moth was retarded during late May by cool weather in most fruit-growing areas. Larval entrances were re-

ported from many areas during late May and early June, but infestations appear to be generally light.

Infestations of the red-banded leaf roller have been reported from many areas, including Massachusetts, New York, New Jersey, Maryland, Virginia, West Virginia, Georgia, Ohio, Southern Indiana, and southern Illinois.

Plum curculio infestations were generally light in the areas from which reports were received.

Twig injury by larvae of the oriental fruit moth was reported as lighter than usual in eastern New York, Georgia, southern Indiana, and southern Illinois.

## Problems Presented by Soil-Borne Diseases

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of **AGRICULTURAL CHEMICALS**. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



**S**OME of the most troublesome plant diseases with which growers have to contend, originate in the soil. Most of the organisms causing these diseases—(fungi, bacteria, nematodes, and a few viruses)—persist in the soil for long periods of time. Some of them attack so many different kinds of plants that their presence constitutes a great hindrance to crop-growing in affected locations. Many others attack only one kind, or a group of related plants, but even so, if the host happens to be one of the major cash crops of a region, these organisms are equally damaging to agriculture.

Perhaps, eventually, safe effective soil treatments economical for field use, will be developed for all types of these diseases, as has been done already for those caused by nematodes. Except for nematodes, however, the only sure means of

avoiding loss at present, in soil known to be infested, is to plant resistant varieties or some entirely different crop known not to be attacked by the particular disease.

Of course it is important to keep any of these organisms from spreading into fields or regions now free. Means of spread are various: in soil clinging to shoes of men, feet of animals, tools, farm machinery, or roots of plants brought in from infested areas; by drainage or flood waters or streams flowing through infested spots; some may possibly be blown through air for longer or shorter distances; some are seed-borne; and all may be carried in active infections in roots or tubers of susceptible plants.

From time to time the *Listening Post* has included reports on one or another of these soil-borne diseases. Following are some addi-

tional examples, illustrating some of the varied problems that these diseases present.

#### Cabbage Yellows in Florida

**A.** H. EDDINS and Stanley M. Burrell, of the Florida Agricultural Experiment Station Potato Investigations Laboratory at Hastings, report that cabbage yellows caused by the fungus *Fusarium oxysporum* form *conglutinans* was observed by them in cabbage fields in the Hastings area for the first time in November 1948.

No reports of yellows in cabbage fields outside of the Hastings section were received during the 1948-1949 season. It was found at Hastings in 27 fields comprising approximately 313 acres. It destroyed 50 to 90 percent of the crop in 30 acres; 10 to 30 percent in 78 acres and 2 to 5 percent in 108 acres; a trace was seen in 97 acres. The disease may have been present in other fields but was not recognized or was not reported by the owners. The writers did not have time to inspect all fields, comprising about 7,500 acres, planted to cabbage in the Hastings area. The disease was scattered in some fields, with more plants showing infection in low-lying dark soil than in higher, lighter sand. It was uniformly distributed in other fields regardless of the lay of the land and the type of soil. The disease was found in yellows-susceptible Glory of Enkhizen and Copenhagen Market varieties which were planted on 95 percent or more of the acreage. It was not seen in plantings of resistant Marion Market.

The first report of cabbage yellows in Florida was made by Weber, who found it in a winter crop of cabbage in the vicinity of Bartow in October 1936. He reported that it was present in several fields, and that it probably was introduced about 1920 in cabbage plants sent from Racine, Wisconsin for seed production. Apparently, infested fields at Bartow have been planted to yellows-resistant varieties of cabbage or to non-susceptible crops

since 1936, as the disease has not been reported as causing any damage there since that year.

No appreciable development of yellows occurs at soil temperatures below 60° F. or above 95° F. The winter of 1948-1949 was extremely mild in Florida and temperatures favored development of yellows in all cabbage-growing areas of the State.

The yellows organism was introduced into the Hastings section with affected seedling plants grown in yellows-sick soil in other States. During the last 10 years most of the early fall crops in the Hastings area have been set with plants imported mostly from Georgia. Plants grown in North Carolina, Tennessee, Virginia, and probably other States have also been used. The disease was not prevalent and destructive in fields set with imported plants for several years in succession. None was found in fields which have been set with plants grown locally in yellows-free soil. Just when the disease was first introduced and from what State or States it came, is not known.

#### Tobacco Wilt in N. Carolina

**E.** L. MOORE and G. B. Lucas of the North Carolina Agricultural Experiment Station, and E. E. Clayton of the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, state that black shank, caused by the fungus *Phytophthora parasitica* var. *nicotianae*, was first found in North Carolina in 1931, in the western part of the State. Spread was only local until 1937, when the disease appeared in Pitt County 200 miles to the east. Black shank has been spreading with increasing rapidity during the last two or three years, and it now occurs in nearly all of the 62 flue-cured tobacco producing counties. During this time it has invaded 25 central and eastern counties, causing severe losses. Eleven eastern counties had from two to four times as many fields infested in 1948 as in 1947. In this group Pitt County, which leads the State in tobacco production, had

black shank in fields comprising 60 to 65 percent of the 32,000 acres in tobacco in 1948. At least five counties, including Forsyth and Stokes in the west, Rockingham in the central, and Pitt and Green in the eastern part of the State, are so badly infested that it is advisable to grow only varieties resistant to black shank.

Black shank is such a destructive disease that once it is established on a farm a grower is practically forced to use resistant varieties or to discontinue the use of affected fields for long periods. For many farmers the latter practice cannot be followed because of lack of suitable tobacco land. On the other hand, attempts to continue the growing of susceptible varieties on infested land have frequently led to very heavy crop losses.

A Green County farmer in 1947 sold tobacco harvested from 5½ acres after a severe infestation of black shank for \$128. In 1946 the same variety on the same land produced tobacco that sold for \$3800. Almost a normal crop was produced in 1948 by a resistant variety. A Pitt County farmer did not harvest a single leaf from 4 acres planted to a susceptible variety in 1948.

Black shank-resistant varieties available at present are serving a useful purpose in reducing losses from this disease. However, there is urgent need for improvement. Those with highest resistance are generally inferior to the better standard varieties in yield and quality when grown in the absence of the disease. Varieties that are best from the standpoint of yield and quality have only fair to moderate resistance.

Losses from another soil-borne tobacco disease, Granville wilt or bacterial wilt caused by *Bacterium solanacearum*, in the eastern and central parts of the State have been reduced from more than 50 percent of the crop in certain areas to less than 5 percent through the use of the wilt-resistant variety Oxford 26. Although it is estimated that this variety has saved

\$2,000,000 a year for growers in the Granville wilt area, there is a real need for a new wilt-resistant variety that will produce more cigarette tobacco per acre than Oxford 26 does under high levels of soil fertility.

An increasingly important complication reported by these authors is the spread of black shank into fields infested with Granville wilt. The number of farms with both Granville wilt and black shank is small, but there is rapid increase in the overlap of these two diseases. By conservative estimate, hard hit Pitt County had 200 farms with both diseases in 1948—twice as many as had both diseases in 1947.

Breeding programs are being conducted to develop better resistant varieties for each disease, and to combine resistance to both in one variety. The authors conclude that much remains to be done with a view to combining, within a single variety, resistance not only to Granville wilt and black shank but also to nematodes and other prevalent diseases. The results do indicate, however, that: (1) it is possible to develop higher yielding wilt-resistant varieties, and (2) that wilt- and black shank-resistance together can be combined with improved yield and quality.

#### Verticillium Wilt in Ga.

THE *Listening Post* for September, 1948, reported the discovery of cotton *Verticillium* wilt, caused by the soil-borne fungus *Verticillium albo-atrum*, in North Carolina, for the first time in the South Atlantic region. B. S. Hawkins and B. B. Higgins of the Georgia Agricultural Experiment Station report its occurrence in Georgia also. It was first found in August, 1948 in one field in Fayette County, on plants growing on heavy soil near a barn. Affected plants showed only a slight stunting and little, if any, reduction in yield. However, they had shed a number of leaves and the re-

maining leaves showed various degrees of mottling. In early September, similar diseased plants were found in Spalding County, growing on land where a house had formerly been located. In October, diseased plants were also found in a fertile, rather poorly

drained field in Gordon County. The number of infected plants was small at all locations and no appreciable reduction in yield resulted, as the infected plants were only slightly stunted and remained alive, producing a satisfactory crop.

## NAIDM Hears Cuff, Knipling, Fulton, Rohwer

The 35th annual mid-year meeting of the National Association of Insecticide and Disinfectant Manufacturers was held at the Drake Hotel, Chicago, June 13 and 14. The group voted unanimously to adopt a new name: Chemical Specialties Manufacturers Association, Inc. Under the new setup, the association will be composed of five divisions.

Speakers at the June meeting included Dr. S. A. Rohwer, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A.; Ray L. Cuff, regional manager of the National Livestock Loss Prevention Board, Kansas City, Mo.; Dr. R. A. Fulton, Bureau of Entomology and Plant Quarantine; and Dr. E. F. Knipling, chief of the Division of Insects Affecting Man and Animals.

Mr. Cuff told the insecticide manufacturers that western cattle raisers want spray materials that "will keep stable flies off our beef cattle for about three weeks". He said that the need is for something that will kill insect pests quickly, and will continue its effectiveness long enough so that fewer sprayings will be necessary.

The Livestock Loss Prevention Board is experimenting with various combinations of insecticides, Mr. Cuff said, but the cooperation of manufacturers is needed to perfect these compounds. He pointed out that although most emulsions are considered by their makers to be "perfect", yet the conditions under which they are used by cattle men prove many emulsions to be unstable. After standing for two or three days, the emulsion is frequently found by cattle men to be broken down and the effective ma-

terial "either settles to the bottom or rises to the top. Then, when we use it, we find that we're either putting on pure water or else concentrated spray", he declared.

Dr. Fulton spoke about the advantages of greenhouse use of aerosols from the standpoints of better control of insect pests and plant disease, and a saving of approximately 95 percent in labor costs. He said that the U.S.D.A. has about 3,500 acres under glass and that about 90 percent of these are being treated by the aerosol method. Very little plant injury has been caused by this method, he reported.

Dr. Knipling described various tests to determine contamination of milk from dairy herds whose barns have been treated with DDT. Where no precautions were taken, it is impossible to prevent contamination, he said. The toxic materials may be traced to spray falling on feed troughs, in many cases. Analysis of cows housed in four barns where the troughs had not been protected, showed from 0.5 to 1.5 parts per million of DDT in the milk on the second day after application.

Where troughs were covered during the spraying, analysis of the milk showed "practically no DDT present", he stated. These preliminary data, Dr. Knipling declared, "indicate that it may be possible to apply DDT in dairy barns without significant contamination. The tests prove that we have to be careful in applying this insecticide."

Tests to determine if cattle might inhale DDT which had

Turn to page 80



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## Technical Briefs

### Fertilizer Increases Cotton

A DEMONSTRATION of the value of applying a balanced fertilizer in growing cotton was carried out recently by the Louisiana State University agricultural experiment station. Figures from the demonstration show that the increased yield brought about by the balanced fertilizer totals more than the total of increases brought about by applying the nitrogen, phosphorous and potash individually to separate plots.

In the experiment an application of 600 pounds of 8-8-8 fertilizer on fine sandy soil brought an increase of 1,111 pounds of seed cotton per acre over an untreated check plot. As a further check, the nitrogen, phosphorous and potash making up 600 pounds of 8-8-8 were applied separately to nearby plots.

The plot which received nitrogen alone showed an increase of 352 pounds over the untreated check plot; the plot that received phosphorous alone showed an increase of 129 pounds; and the plot which received potash alone showed an increase of 326 pounds. The total increase obtained in this way amounted to 807 pounds, or 304 pounds less than the increase obtained by planting a balanced fertilizer containing all three elements.

In other tests using the three possible combinations of two of the three elements, (nitrogen and phosphorous on one plot, phosphorous and potash on a second, and potash and nitrogen on a third) the greatest increase was 1,039 pounds, obtained by use of potash and nitrogen.

### Weed Control in Onions

Results from tests on experimental plots and in commercial fields of onions grown from sets, indicate that a 2 percent solution of

potassium cyanate at the rate of 80 gallons per acre is effective in controlling small, annual weeds in fields of set onions. Where three or four timely applications were given during the growing season, no hand weeding was necessary. This herbicide should be used as a side spray and not as a direct foliage spray for the material is not sufficiently selective to permit an over-all application without reducing yields.

A pre-emergence application of 75 to 150 pounds of cyanamid dust per acre controlled weeds well for several weeks and was a valuable supplement to the spraying program with potassium cyanate.

—Wm. H. Lackman, Mass., Agricultural Experiment Sta., Amherst, Massachusetts.

### Predicts Two-Generation Pest

Dean Asquith, Assistant Professor of Economic Entomology, Pennsylvania State College, has predicted that the European Fruit Lecanium, *Lecanium corni*, Bouché will have two generations this year in Adams County, Pa. Prof. Asquith bases his conclusions on the fact that in late March, newly-molted adult females were collected from peach trees on which buds were in the pink. "Since adult females are sedentary, the only explanation for the fact that we found adult, egg-laying females on 1948 growth last August, is that there are two generations in this area", he says.

"We expect the overwintering generation to produce honeydew in late May and early June. Eggs of the first generation will probably hatch during June. Then, if the 1948 schedule is followed, there will be another shower of honeydew in late July and early August. And eggs of the second generation

will hatch from mid-August to mid-September.

"We venture to make this prediction with the hope it may help fruit workers in other areas where black peaches have been a problem," he concludes.

### DDT Residues on Fruit

This summary reports the results of two studies relating to DDT spray residue on apples. The first relates to the effect of washing on the removal of DDT residue, the second to the effect of certain stickers and spreaders on DDT residue and of overhead sprinkling on removal of DDT residue.

The results of the first study may be summarized as follows:

When 42 apple samples with an original DDT residue ranging from 5.0 to 22.3 parts per million were washed by three different treatments, a high percentage of the washed samples had a significant amount of DDT residue removed. Nevertheless, none of the washing treatments removed sufficient residue from all samples to make these treatments practicable for commercial use. Sixty pounds of sodium silicate per 100 gallons of water at 100° F., in a single-unit washer gave a more efficient DDT residue removal than 1.5 percent hydrochloric acid at 100° F., in a single-unit washer, and was equally as effective as the tandem wash of sodium silicate followed by hydrochloric acid.

When the original DDT residue on apples exceeded 10 parts per million, the standard washing practices in north-central Washington were not sufficient to reduce this residue consistently to a point equal to or less than the permissible tolerance limit of 7 parts per million.

In the second study it was found that—

(1) The addition of light-grade petroleum oil increased the DDT residue significantly over the straight DDT spray.

(2) The addition of dry-casein-

type spreader did not significantly increase the DDT residue over the straight DDT spray.

(3) The addition of liquid-soap-type spreader significantly decreased the DDT residue over the straight DDT spray.

(4) Twenty-four hours of overhead sprinkling irrigation with an oscillating sprinkler that delivers approximately 5 acre-inches of water in a 24-hour period did not remove significant amounts of DDT residue from fruit sprayed with wettable DDT, wettable DDT and petroleum oil, wettable DDT and dry-casein-type spreader, or DDT and liquid-soap-type spreader. — *J. Agricultural Research*, May 15, 1949.

#### Fertilizer on Rice

The use of fertilizers on rice in Louisiana has increased markedly since 1942 and the farmers' interest in different fertilizers and the methods of their application has increased even more. Heavy weed infestations and the difficulty of controlling weeds in a rice field, especially one that has received a liberal application of nitrogenous fertilizer at or before planting, have limited the use of fertilizers and the benefits from them. Experience and experiments have shown that when an amount of nitrogen greater than 16 pounds per acre is applied with and at the same level as the seed the increase in weed growth tends to depress the increase in rice due to fertilizer. Since in its most efficient use, one pound of nitrogen is required for the production of one bushel of rice, methods conducive to the effective use of more nitrogen had to be developed.

Two methods for the addition of complete fertilizers to rice have been successful. One involving the application of 300 pounds per acre of 0-16-0, 3-9-6, or 3-12-12 with or under the seed at planting, followed by applications of 24 to 32 pounds per acre of nitrogen as a topdressing before the booting stage, has given good results. A

modification of this scheme for water-planted rice where the phosphate or complete fertilizer is applied before planting and the extra nitrogen as a topdressing shows particular promise.

The other method, which has been more successful, involves drilling the fertilizer two inches below the seed at planting. Fertilizer experiments with this procedure have been conducted throughout the rice area. The placement of the fertilizer below the seed has increased the yield of rice 8.5 bushels per acre over the old method of drilling the fertilizer

directly with the seed. The increase in the efficiency of the fertilizer has made possible better evaluation of the adaptation of various grades to the different soil conditions. The best adapted mixtures have been 6-6-6, 9-6-9, 6-9-9, 3-9-6, and 6-9-0 applied at the rate of 400 pounds per acre. The average increase due to fertilizers was 20.9 bushels per acre.

Minor elements were applied in 1948, but no significant increases were obtained.—R. K. Walker and M. B. Sturgis, *Louisiana Agricultural Experiment Station, Baton Rouge, Louisiana*.

## Experiment Station Bulletins

#### Corn Borer Bulletin

Technical Bulletin No 976, entitled "European Corn Borer Location on the Corn Plant as Related to Insecticidal Control" has been issued by the U.S. Department of Agriculture. Written by C. H. Batchelder, the 20-page booklet gives detailed information on the distribution of larvae in different parts of the plant, and how this affects the application of insecticides for most effective kill. The sequence of biological events during growth stages of the corn plant are noted, indicating that certain physical properties are needed in insecticidal materials at different stages. This information affects the procedure required in the application of insecticides.

The bulletin is for sale by the Superintendent of Documents, U.S. Govt. Printing Office, Washington 25, D.C., for 10 cents.

#### 2,4-D Tables Presented

The *Reclamation Era* for June carries an article on "How much 2,4-D for the Sprayer", by T. E. Leiper. It suggests a means of determining how much liquid spray the rig will apply per acre, by measuring the amount of solution delivered per minute by one of the nozzles, and applying the figure to a chart published with the article.

The chart, based on a formula suggested by the U.S.D.A. Bureau of Plant Industry, Soils and Agricultural Engineering, correlates the number of gallons per acre with the distance between nozzles and the ounces per minute delivered from each nozzle.

The article also gives tables for determining the proportion of herbicide and water, taking into consideration the type of herbicide (butyl, ethyl, isopropyl or amine esters of 2,4-D) weight per gallon, pounds of acid per gallon, and giving the amount of herbicide per 100 gallons of spray. The *Reclamation Era* is published by the U. S. Department of the Interior, Washington 25, D. C.

#### U.S.D.A. Announces Bulletins

The U. S. Department of Agriculture has announced the availability of recent publications under both the "E" and "ET" series. These are listed as follows: ET-266; "A Method for Testing Residual Deposits," by P. G. Piquett, R. H. Nelson and E. R. McGowan; and ET-267, "Directions for Determining Particle Size of Aerosols and Fine Sprays," by A. H. Yeomans.

Bulletin E-775 is titled "Screening Tests for Materials to Increase

Turn to page 71

# Suppliers' Bulletins

## Four Hercules Folders

Hercules Powder Co., Wilmington, Del. has recently issued four bulletins on toxaphene. Two of the folders cover control of grasshoppers, one discusses control of cotton insect pests, and the fourth is a comprehensive brochure describing most of the varied applications of the material.

The latter, entitled "Facts about Toxaphene Insecticides" gives a history of the development of the material and lists the insects which are controlled by it. All of the literature is available from the company.

## Weight Printer Bulletin

Yale & Towne Mfg. Co., Philadelphia, has issued a new 12-page bulletin describing its new Load King Scale Weight Printer. All available models are detailed, and illustrations show the component parts of the printer as well as its final assembly. Examples of printed tickets and a bill of lading are also included. Write for bulletin P-1135.

## Imprint Letterheads Offered

The committee in Fertilizers of the American Society of Agronomy has announced the availability of letterheads containing four full-color photographs of nutrient-deficient plants. Down the left hand side of the 8½ x 11 sheet, in panels 1½ inches wide are the pictures, with this legend: "Plants tell their needs. Corn speaks . . ." The photos show corn deficient in nitrogen, potash and phosphorus; and acting as a dry weather signal.

The color printing has been arranged by the committee under the chairmanship of W. E. Colwell, North Carolina State College of Agriculture. "Your own letterhead may be imprinted, thus increasing the attractiveness and educational value of your letter," he points out. "Recognition of these defi-

ciencies is the first step toward their correction and a very important aid to higher crop yields," he concludes.

In charge of arranging for letterhead imprinting is H. H. Tucker, member of the committee. Detailed information may be secured from Mr. Tucker, care of Coke Oven Ammonia Research Bureau, Inc., 50 W. Broad St., Columbus, O.

## 2,4,5-T Report Issued

A preliminary report on use of 2,4,5-T herbicides has been prepared by Monsanto Chemical Co., St. Louis, Mo. The report describes the utility of the material for brush and woody plant control, giving physical, chemical and formulation data. A summary of application methods and a synopsis of experimental results with the material is also given. An appendix lists the weeds known to be sensitive or tolerant to 2,4,5-T. The bulletin is available from the company.

## Bacterial Canker Described

Oklahoma Agricultural Experiment Station, Stillwater, has issued bulletin No. B-334, "Bacterial Canker of Cowpeas", by D. A. Preston. The booklet describes the disease, its symptoms, how it is spread, and control means. A table of varietal susceptibility is included.

## Eston Publishes Bulletin

Eston Chemicals, Inc. has published a new technical bulletin on its product "Alkron", organic phosphate insecticide. This material, newest in the company's insecticide line, is said to be particularly effective in control of aphids, spider-mites and other agricultural pests. Complete technical information is given on formulation, with recommendations for handling and use. Write Eston Chemicals, Inc., 3100 E. 26th St., Los Angeles 23.

## Bantam Mixer Described

Sprout-Waldron & Co., Muncy, Pa., has issued bulletin 39-B which illustrates and describes the "Bantam 'VA' Mixer", with a 10 cubic foot capacity for small quantity batch mixes. The unit is motor-driven and completely self-contained, the literature states. Bulletin 39-B pictures the machine and gives complete detailed drawings of its functions. Copies are available.

## New Loader Is Announced

Tractomotive Corporation, Deerfield, Ill., has announced its new model TL-B Tracto-Loader, with a ten cubic feet standard bucket. It is mounted on rubber tires, with the bucket over the driving wheels to make for better traction and easier steering, the makers say. The unit is designed primarily to handle bulk materials in small congested areas where working space is small. It will enter a standard six foot box-car door without having to back up and turn, and will handle from 20 to 25 tons of most bulk material per hour on a 300-foot round trip haul.

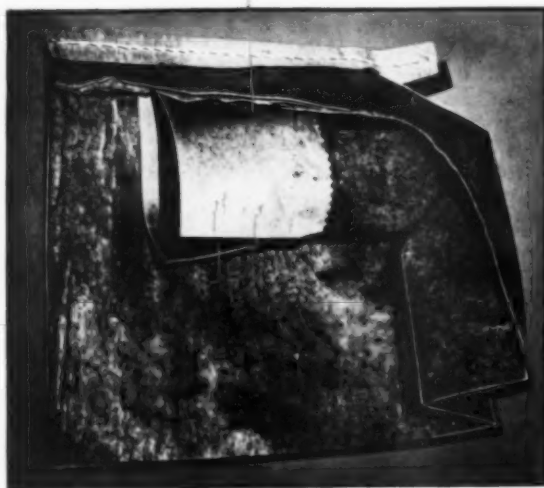
## Parathion Manual Is Revised

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y., has issued a newly-revised dust mixers' manual covering problems involved in the formulation of parathion insecticides. Given complete treatment in the bulletin are subjects such as medical and hygiene requirements for processing parathion dust concentrations; its toxicology on humans and animals; and general precautions regarding clothing, showers, food, maintenance and isolation.

Full information is given for dust blending, including the properties of parathion, handling the dusts, ventilation, storage, etc. A number of charts are presented to show an ideal layout for such work. Write to the company's insecticide division for a copy of the booklet.



## EXCLUSIVE FEATURES



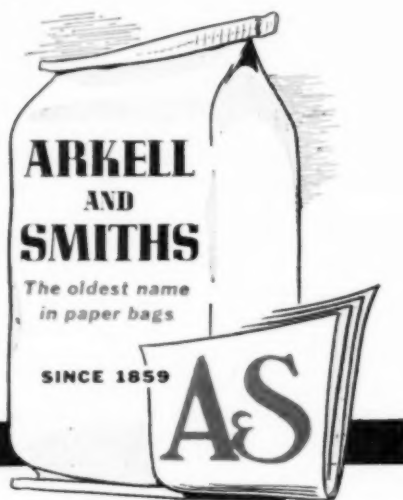
**S**TUDY THIS cutaway illustration of the SHUR-CLOSE Valve Bag. The overlapping action at the top of the bag channels the material into the bag to give less dusting while filling. The two-way action of the valve comes when bottom section of valve crosses over giving quick, complete seal after bag is filled.

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AGRICULTURAL CHEMICALS

# INDUSTRY NEWS

## Dr. Bonnell to U.S.I.

Appointment of Dr. Daniel E. Bonnell, Denver, Colo., as technical representative for California and



Dr. D. E. Bonnell

Arizona, has been announced by U. S. Industrial Chemicals, Inc. Dr. Bonnell formerly was president and general manager of the Western States Chemical Corporation, of Denver.

His duties include supplying technical assistance to insecticide manufacturers and developing new applications of U.S.I. Pyrenones in the field of food and food product protection. His territory is a part of the Pacific Coast division, with headquarters in Los Angeles.

Dr. Bonnell is a graduate of the University of Washington and received his Doctor of Philosophy degree from Oregon State College.

## Penick Synthesizes Pyrethrum

S. P. Penick Co., New York, reports that its Jersey City laboratories have succeeded in putting into limited commercial production, the allyl homolog of Cinerin I, a synthetic pyrethrum material. Harold Noble, vice president, reports that initial tests made on houseflies in Peet-Grady chambers, indicate that the synthetic prod-

uct is as toxic as the natural material. Use of the material for control of other insects is being studied.

Production of pyrethrin-like esters almost identical in structure with the insecticidal principles in natural pyrethrum was announced March 15 by the U. S. Department of Agriculture, Agricultural Research Administration. The announcement by the Penick Company of commercial production of synthetic pyrethrum is said to be the first successful attempt to produce the material on a scale larger than laboratory samples. It is evidence of the ability of industry to apply the complex process to early commercial production of the material.

Limited quantities of the allyl homolog will be available to insecticide manufacturers within a short time, the company has announced.

## MEETINGS

Field Meeting for Insecticide & Fertilizer Mfrs., Dealers and Salesmen, Edisto Experiment Station, Blacksville, S. C., July 28, 1949.

Centennial Symposia on Plant Nutrition, University of Wisconsin, Madison, September 1-7, 1949.

American Phytopathological Society, northeastern division's 1949 summer meeting (tour) beginning at New Brunswick, N. J., September 8, continuing two days. (Write E. G. Rex, P.O. Box 1, Trenton, N. J.)

National Agricultural Chemicals Association, Essex & Sussex Hotel, Spring Lake, N. J., September 7-9, 1949.

American Society of Agronomy, Milwaukee, Wisconsin, October 24-28, 1949.

California Fertilizer Association, 26th Annual Convention, Palace Hotel, San Francisco, Calif., November 7, 8, 9, 1949.

North Central Weed Control Conference, Sioux Falls, S. D., Dec. 6, 7, 8, 1949.

American Association of Economic Entomologists, 61st Annual Meeting, Tampa, Florida, December 13, 14, 15, 16, 1949.

## Chlordane Ruling Reversed

The following release has been received from Julius Hyman & Co., Denver, Colo., in connection with its litigation with Velsicol Corp., Chicago, over patent rights on the insecticide, chlordane:

"In a decision reversing the Superior Court of Cook County, the First Division of the Appellate Court of Illinois on Monday, June 20, 1949, ruled in favor of Dr. Julius Hyman in the suit for ownership of the patent applications on chlordane. . . . This suit had been instituted by Velsicol Corporation of Chicago.

"Title to the chlordane patent applications has been in litigation since 1946, when Dr. Hyman left his position as Executive Vice-President of Velsicol Corporation and subsequently organized Julius Hyman & Company.

The decision of the Illinois Appellate Court, however, is being appealed to the Illinois Supreme Court by Velsicol Corp. Velsicol points out in a statement announcing its intention to appeal, that purchasers of chlordane from Velsicol cannot become involved in litigation. It has never been contended that Velsicol Corporation does not have the right to make and sell chlordane, the only point at issue having been whether or not Velsicol possesses the "exclusive" right to make the product.

## Phillips Enlarges Capacity

Phillips Chemical Co., Bartlesville, Oklahoma, a subsidiary of Phillips Petroleum Co., has announced the doubling of production capacity of its Cactus anhydrous ammonia plant at Etter, Tex.

The ammonia plant will have a capacity of over 140,000 tons a year compared to the previous capacity of only 70,000 tons. The additional facilities are expected



to be ready for operation late this summer and will help relieve the shortage of ammonia used in the production of fertilizers. The Cactus plant supplies anhydrous ammonia to Phillips Chemical Company's ammonium sulfate fertilizer manufacturing plant at Port Adams, near Houston, Texas.

Company officials have also announced that other facilities are being installed adjacent to the ammonia plant for the production of nitric acid to be used in making ammonium nitrate fertilizer.

#### NAC Plans Sept. Meeting

Plans for the annual fall meeting of the National Agricultural Chemical Association are under way, according to Lea S. Hitchner, Washington, D. C., executive secretary and treasurer of the group. The dates will be September 7-9, at the Essex and Sussex hotel, Spring Lake, N. J.

#### Pyrethrum Supply "Good"

Despite a brisk demand for non-toxic insecticides, the supply outlook for pyrethrum appeared bright as we went to press. Favorable weather for growing the flowers in Kenya, E. Africa was expected to increase the output and in turn permit a heavier import to the U.S.

Industry spokesmen stated that prices will no doubt climb upwards, some venturing to say as much as

15 percent. The use of synthetics during the past five years, a low crop production in 1948 and lack of important insect infestations in the U.S. for the past two seasons have resulted in abnormally low inventories and firming price levels.

Imports of pyrethrum this year are expected to reach well over 7,000,000 pounds, more than twice the 1948 total. However, industry spokesmen reminded that this is but one third the peak importations which in 1946 reached a total of 20½ million pounds. Last year's total was 3,633,158 pounds.

#### Otis F. Curtis Dies

Prof. Otis Freeman Curtis, Cornell University plant physiologist, died suddenly July 4th at Chatham, Mass. He was born in Japan in 1888, and received degrees from Oberlin and Cornell. He has been associated with the Cornell fac-

Toxaphene exhibit (below) recently set up in the new conference and exhibit room at the Hercules Powder Company's main offices in Wilmington, Del. The exhibit shows the manufacture of finished insecticides starting with technical toxaphene and a view of the Brunswick, Ga. plant of Hercules where the latter is made. Other panels picture sales and advertising promotion used to help sell toxaphene formulations to farmers. The use of toxaphene dusts and sprays in 1949 will be three times that of 1948, the first year the product was on the market.

ulty since 1913, and held important honorary positions through the years. He had just completed a new text book in collaboration with Prof. D. G. Clark of Cornell.

#### Du Pont Answers Charges

The U. S. Department of Justice on June 30 filed civil suit in a Chicago court alleging violation of the Sherman and Clayton anti-trust laws by E. I. duPont de Nemours & Co., Inc., Wilmington, Del.; General Motors Corporation and other companies. Following is a statement made by Crawford H. Greenewalt, president of the duPont Company, commenting on the U. S. action:

"The Du Pont Company emphatically denies that its relationships with General Motors and the other companies mentioned in the complaint have been either illegal or in any way detrimental to the interest of the people of the United States.

"On the contrary, these relationships have served the public interest in a conspicuous way; and in that firm belief we will defend our actions and our present position with the utmost vigor.

"Since these relationships have been a matter of public record and public information for many years, the motive for this suit must arise out of a determination by the Department of Justice to attack bigness in business as such. We cannot believe that such a position is or will be supported by the American people because in the end it would increase prices, reduce living standards, and even weaken the national security."



# Fertilizer News

## Canadian Fertilizer Meeting

The fourth annual convention of the Canadian Plant Food Producers—Ontario, was to be held June 28-30 at the Manoir Richelieu, Murray Bay, Quebec, Canada. According to advance information issued by Alex Mooney, Toronto, secretary-treasurer of the association, the group was to leave by steamship from Montreal on Sunday, June 26, and was to arrive at Murray Bay in time for the meeting two days later.

The Plant Food Producers—Ontario, are associated with fertilizer groups in Quebec, Nova Scotia, New Brunswick and Prince Edward Island, all of whom send representatives to the meeting. A sizeable delegation of American producers was expected to attend the Murray Bay convention.

## W. T. Hart to New Position

Wilson T. Hart, formerly chief of the fertilizer section of the office of material distribution, U. S. Department of Commerce, has been appointed vice president of Nitrogen Products, Inc., New York, it was announced recently. He was to assume his new duties on July 1.

For the past six years, Mr. Hart has been in government service, but has maintained close touch with the fertilizer industry. He expects to continue to reside in Washington for the time being.

## Record Potash Deliveries

Potash deliveries in North America reached a new high in the fiscal year ended May 31, 1949, the American Potash Institute has announced. The increase over the previous year amounted to six percent. Deliveries by the five leading American Potash producers in the U. S., Canada, Hawaii, Cuba, Puerto Rico and a few other coun-

tries reached a total of 1,169,548 tons  $K_2O$  (including imports from Europe into the U. S.)

Deliveries for agricultural purposes in the continental United States amounted to 1,000,901 tons  $K_2O$ , which is an eight percent increase over last year. Principal grade was 60 percent muriate of potash. It comprised 79 percent of the total agricultural potash delivered.

## Albert F. Arbeit Dies

Albert F. Arbeit, 51, sales manager of the Diamond Fertilizer Co., Sandusky, Ohio, died June 1 following a heart attack. He had been associated with the Diamond Co. for the past 11 years and was also president of the Ohio Pesticide Institute. In addition to his business connection, he was active in numerous civic and social organizations in the Sandusky area.

## African Plant Under Way

A new ammonia and nitrate plant is under construction at the Modderfontein factory of Africa Explosives and Chemical Industries, it has been reported in the U. S. Some 30 acres are being cleared for the project which will cost 2 million pounds, and will require an estimated three years to complete.

Production from the new plant in 1952 is expected to make the Union of South Africa entirely self-supporting so far as ammonia and nitrates are concerned. It is then expected to become an exporter of these materials, and may be able to supply the needs of the Rhodesias, the Congo and East Africa.

At present, the Union has to import all of its nitrogenous fertilizers. Last year, such imports amounted to more than 30,000 tons (mainly in the form of am-

monium nitrate) and the imports of nitrate of ammonia totaled 12,000 tons.

## Del-Mar-Va Convention Held

The Del-Mar-Va Peninsula Fertilizer Association met on June 25 for its 24th annual convention. The meeting was held at the George Washington Hotel, Ocean City, Maryland, and was attended by fertilizer manufacturers, dealers and salesmen. Dr. Vincent Sauchelli, Davidson Chemical Corp., Baltimore, Md., addressed the group on the subject, "Research and the Land."

## French Fertilizer Increases

The fertilizer industry of France, according to Seabrook Hull in the June issue of *Chemical Engineering*, is endeavoring to meet its increasing domestic requirements. In the fertilizer year, 1948-49, its production of Nitrogen was 180,000 tons as compared to 240,000 tons consumption. Phosphate was 543,000 tons of production against 464,000 tons of consumption. The figures for potash were 740,000 tons against 312,000 tons.

Estimates for the 1952-53 year are expected to be as follows: Nitrogen: 350,000 tons production against 450,000 tons consumption. Phosphate, 980,000 tons produced and 800,000 tons consumed. Potash, 940,000 tons produced against 700,000 tons used. In all cases, the excess or deficiency was to be exported or imported, Mr. Hull stated.

## Illinois Plant To Operate

A bulk rock phosphate storage plant capable of holding 550 tons is to be completed soon at Melvin, Illinois. Built by the Ford County Service Co., the plant will be of concrete slab silo type, expected to cost from \$15,000 to \$18,000 which will be met by the sale of stock. Farmers may purchase fertilizer from the company, or may order spreading service by the company.

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#### TOXAPHENE

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## BRUSH CONTROL

*Continued from page 25*

satisfactory job, depending upon factors such as type and density of the vegetation, the texture, fertility and moisture of the soil, and of course the degree of control desired.

### Off the Road Bed

**V**EGETATION on the right-of-way on each side of the road bed itself has received less concentrated attention than on the road bed. This area represents considerably more acreage and the need for vegetation control is quite different. In most instances, grasses are desirable to prevent erosion. Brush, trees, and tall growing weeds must be controlled to prevent them from grounding transmission lines and impairing visibility along the track. Control of this vegetation has been done principally by hand labor and off-track mowers. On many roads, the dead weeds and grasses are burned in the fall and winter months.

The use of 2,4-D and 2,4,5-T for the control of brush and weeds has been tried on an experimental basis on a few hundred miles of right-of-way the last two years with very promising results. Application technique similar to that described for vegetation control on utility rights-of-way is utilized.

## NFA MEETING

*Continued from page 29*

have been led to believe in a redistribution of wealth without regard to merit.

He warned the industry against being timid about investing in sound expansion since if private capital is not able to keep up with advancing techniques, then the Government is likely to step in and compete on a grandiose scale. A general attitude seems to prevail to the effect that "if industry isn't able to produce enough, the government can do it better."

Kent Leavitt, president of the National Association of Soil Con-

servation Districts addressed the convention on "Conservation, Proper Land Use and Fertilizer", following Mr. Keezer. The work of soil conservation districts was described by Mr. Leavitt, with an explanation of the purposes of these 2,250 districts of the U. S. The basic problem, he said, is simply that of feeding more and more people on less and less land. As Mr. Bromfield had mentioned on the

day before, the old attitude of the country toward the land was to exploit it to the fullest, then move on to virgin territory and start all over again. Most of the owners operated on the basis of "the land is mine, I'll run it as I please". The current philosophy is swinging toward one of trusteeship, Mr. Leavitt reported.

The problem is how to apply this knowledge to every acre of land in

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Spraying - Dusting - Soil  
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Technical and Concentrates

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Wettable, Emulsifiable and  
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An oil compatible fungicide  
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the U. S. without changing our form of government. He pointed out that in England, under the present leadership, no farmer can farm as he wants. Agriculture is completely regulated to the extent that any uncooperative operator is taken off the land and replaced by someone who is more inclined to do as he is told.

Mr. Leavitt stated that the job can be done through the Soil Con-

servation Districts already in existence. He said that for the most part these locally-operated groups can accomplish all that needs to be done, except in exceptional cases where extensive engineering is necessary. In these instances, and these alone, the Federal Government can assist. He pointed out now completely unnecessary it is for the Federal treasury to expend billions and put hundreds of thou-

sands of persons on the payroll to do the job. Yet, this type of "aid" is what many are demanding, he said.

Education must play an important part in the soil conservation program, he said. Farmers must be reminded that we do not live in a land of unlimited resources; that what we do have must be conserved. Agriculturalists must be taught to handle the land so it gives a perpetual income; not merely more produce per acre and more profit, although such are obviously necessary . . . but they must learn proper land use.

Chairman King adjourned the meeting soon afterward, following a brief memorial service lead by J. Rueker McCarty, International Minerals & Chemical Corp., East Point, Ga. The new Board of Directors held a meeting immediately following the adjournment of the open session.

New members were elected to the NFA board of directors at the meeting. These included James E. Totman, president, Summers Fertilizer Co., Baltimore, who was named vice-president of the board. Ray L. King will remain chairman of the board; Dr. Russell Coleman will continue as NFA president; and Daniel S. Murph succeeds himself as secretary-treasurer of the Association.

Directors at large, whose terms expire in 1952, were named as follows: M. S. Hodgson, Empire State Chemical Co., Athens, Ga.; John E. Powell, Smith Agricultural Chemical Co., Columbus, Ohio; and Ralph E. Fraser, Summers Fertilizer Co., Bangor, Me.

District representatives to the board, were elected for two-year terms, as follows: Burton B. Fall, Rogers & Huggard Co., Portland, Conn.; W. Newton Long; F. N. Bridgers Farmers Cotton Oil Co., Wilson, N. C.; J. L. Nichols, Sumpter Fertilizer Mfg. Co., Sumpter, S. C.; L. D. Hand; Weller Noble, Pacific Guano Co., Berkeley, Calif.; and Graham Campbell, Chamberlin & Barclay Fertilizer Co., Cranbury, N. J.

**PYRAX ABB** is the most widely used Pyrophyllite in the agricultural field as a carrier for insecticides and fungicides.

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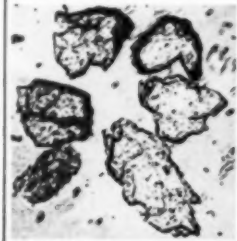
A dense cloud that hugs the crop and adheres electrostatically (even to the under side of foliage when dry) insures less waste and permits effective daytime dusting.

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## Congressional Subcommittee Sees Ample Supply of Agricultural Nitrogen for 1950

**A**N adequate supply of nitrogen fertilizer for next spring is anticipated in the report of the Subcommittee on Fertilizer of the House Committee on Agriculture. The report, submitted to the chairman of the Committee on Agriculture on June 10, indicates nitrogen for export will be manufactured by three Army plants only, and the remainder of U. S. production will be available to the domestic market. The three plants to be retained by the Army for the fiscal year are the Ohio River Ordnance Works, West Henderson, Ky., with a capacity of 57,000 tons per year of N in the form of anhydrous ammonia; the Morgantown Ordnance Works, Morgantown, W. Va., with a capacity of 190,000 tons of N per year; and the San Jacinto Ordnance Works, San Jacinto, Texas, soon to be in production, with an

estimated 20,000 tons of N in the 1950 fiscal year.

The committee stated "that it should be understood as a definite policy of Congress, that the Army should continue in the fertilizer production business only so long as a shortage exists; and then only for the purpose of taking care of exports to Japan, the Ryukyus and South Korea."

One of the most significant changes in the domestic supply situation is the leasing to Phillips Chemical Co., a subsidiary of Phillips Petroleum Co., of the former Cactus Ordnance Works at Etter, Texas, which will have a capacity of 120,000 tons of N during the 1950 fiscal year. This total output would be placed on the domestic market for use by American fertilizer manufacturers.

The report, in reviewing the cur-

rent situation, gives credit to the American Plant Food Council and the National Fertilizer Association, as well as to various government agencies, for cooperation with the committee in the drawing of conclusions. It also commends the individual members of the fertilizer industry "for making available during the 1949 hearings information on their production and distribution which had heretofore never been publicly revealed . . ."

"Since 1940," the report states, "the commercial synthetic nitrogen production capacity of the United States has increased by approximately 900,000 tons per year. In 1940, there were approximately 390,000 tons of synthetic nitrogen produced in the U. S. In the fiscal year 1950, there will be an estimated 1,290,000 tons of synthetic nitrogen produced by commercial operators in this country."

It points out that the key to adequate supplies of fertilizer nitrogen for American farmers in the next fiscal year is, first, the con-

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tinned operation of the three plants operated by the Army, for the purpose of providing fertilizer for the occupied areas and for export under the Economic Cooperation Administration program; and, second, the release of the former Army plant at Etter, Texas, for domestic commercial supplies.

Resolutions passed by the committee included the provision that "if the nitrogen situation improves to such an extent during the fiscal year that there is no longer a short-

age of nitrogenous fertilizers for domestic use, the Secretary of Agriculture may so notify the Secretary of the Army and the Army may curtail production from any or all of its plants."

Section 2 authorizes the Army to make the production of its three plants available for export not only to the occupied areas, but also, if required, to those countries receiving assistance under the ECA program. The total amount which the Army is authorized to make avail-

able for both its own occupied-area program and the ECA, is 280,000 tons. This maximum is somewhat more than the estimated production capacity of the three Army plants, it is pointed out, but there has been no convincing evidence that the amount of fertilizer proposed to be shipped to all of these areas is actually needed or can be used effectively by the farmers in those areas.

It is also noted in the report that ocean transportation and distribu-

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## Idaho Fertilizer Plant Well Under Way



Scheduled to start production late this summer, the new triple superphosphate fertilizer plant (above) at Wendell, Idaho, is nearing completion. Builders of the new plant are the Gates Bros., Idaho industrialists who are proceeding with the financial cooperation of the Idaho Farm Bureau. Charles T. Gates, president of the new fertilizer company, states that the plant will begin production of phosphoric acid somewhat ahead of the manufacture of fertilizer material. Gates Bros. and the Idaho Farm

Bureau own several thousands of acres of land in Southeastern Idaho. This area will be tapped to supply raw ore for the new plant, it is reported. Idaho is said to have one of the world's largest deposits of phosphate rock.

In the photo are shown four 25,000-gallon phosphoric acid tanks, and at the left, the thousand-ton sulfuric acid tank. At the rear is the main grinding and pulverizing plant, which has already been run in efficiency tests.

### EXP. STA. BULLETINS

*Continued from page 60*

the Effectiveness of a DDT-Pyrethrum Formula" (Supplement to E-733), by Arthur W. Lindquist, Fred R. Shilleutt, A. H. Madden and John E. Williams.

### NITROGEN SUPPLY

*Continued from page 70*

tion in Japan and Korea make up the major proportion of the cost of fertilizers delivered to those countries, so that any slight increase in manufacturing costs in the U. S. would be reflected by only a small percentage of increase in the final delivered cost.

The committee stated that while it is aware of the needs of agriculture in other parts of the world, its primary interest is in the farmers of the U. S. and their ability to produce efficiently and effectively for the American economy. "For the past three years this committee has seen the fertilizer requirements of the occupied areas . . . almost completely filled with the aid of American-made fertilizer, while

American farmers have been unable to obtain the fertilizer they urgently needed and were willing to pay for," the report states. "This committee now feels that in justice to the farmers of this country the export program must take a secondary position and that even a little additional cost will be amply justified in making fertilizer available to American farmers in the quantity they require and in the areas where it is most needed," it continues.

### NFA Revises "Hunger Signs"

The National Fertilizer Association has announced that an enlarged and revised edition of *Hunger Signs in Crops* will be available about September 1.

### Charles J. Brand Dies

Charles J. Brand, 70, executive secretary and treasurer of the National Fertilizer Association from 1925 to 1945, died in Washington on June 29. He had enjoyed a long and distinguished career in many phases of agriculture, beginning with the U.S.D.A. in 1903.



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#### BHC Now Lindane

The U. S. Department of Agriculture has just proposed adoption of a new common name for the gamma isomer of benzene hexachloride which is now to be called lindane. The name is restricted to use on products of a purity not less than 99%. The U.S.D.A. is also reported to be recommending use of lindane as a residual spray inside cow barns, in addition to methoxychlor, previously suggested as a replacement for DDT because of the toxicity hazard of the latter.

#### Helicopter Services Report

Helicopter Services of California, San Francisco, reports that a million pounds of chemical weed killers have been dispersed by helicopter in the state, from records compiled during the spring of 1948 and the first few months of 1949.

The concern states that it has developed special agricultural attachments for the helicopter, including a complete spraying accessory system and specialized units for seeding and dusting. Water for spraying operations is transported by the use of custom-built 500 gallon capacity tank trailers drawn by jeeps. The helicopters are able to land close by and replenish their water supply. The Helicopter Services of California was organized two years ago to serve agriculture and to carry on extensive services for the Federal and State forestry departments in patrol work.

#### Dr. Chadwick Advanced

Dr. David H. Chadwick has been promoted to Group Leader in the Research Department of Monsanto Chemical Company's Phosphate Division.

#### APFC CONVENTION

*Continued from page 41*

than ever before," he said.

Dr. Pierre pointed out that "major changes" have taken place in mid-west agriculture during the past 12 to 15 years, citing "in Iowa, for example, there was an increase of over 2,000,000 acres of soil-depleting row crops, pri-

marily corn and soybeans" and "at the same time the acreage of legume-grass meadows and pastures decreased about 1,500,000 acres." He explained "the result was a more rapid depletion in soil fertility" and "consequently, greater increases were obtained from the use of fertilizers, particularly nitrogen fertilizers."

"Another major development that has made fertilizer use more necessary and more profitable has

been the development of hybrid corn and other improved crop varieties and their widespread use by corn-belt farmers," he added. "Because of their higher yielding potentialities, these crops require a large amount of plant food for maximum yields. They respond to fertilizers, therefore, where the old crop varieties did not."

As final speaker on the panel, Dr. Salter called for a re-examination of the "question of opti-

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mum rates of fertilizer application under conditions combining the most advanced methods of producing crops" and predicted that "studies will show that rates presently recommended under many conditions are considerably below the optimum."

Dr. Salter said agricultural scientists are finding that while one improved crop production practice is beneficial, "the advantages often pyramid when several good practices are used in the right combination." He added that "recognition of this principle is spreading rapidly in research programs throughout the country."

"As sights are raised toward higher and higher yields it will be necessary to give attention to practices that supplement the soil's own ability to give up nutrients to crops," he said. "It is becoming apparent that as we move up toward higher yields, soil becomes more and more a medium through which water, oxygen and nutrients are conveyed to plant roots, and less and less the direct source of plant nutrients."

"In light of these facts it seems obvious that the future is bright for the fertilizer industry."

Dr. Salter said that research results have not proved yet whether or not the "point of uneconomical returns from heavy fertilizer applications" has been reached, but added that "under irrigation in the Columbia River Basin, yields are still going up rapidly with nitrogen rates as high as 240 pounds per acre with the ideal combination of other factors" and "this year we're using rates up to 960 pounds of elemental nitrogen per acre, which should be well above the practical level."

"So far we have no more than scratched the surface with this combined approach to research," he added. "Of this we are sure. We have by no means exhausted the possibilities of still further increasing crop yields as we learn to combine in optimum degree the various factors of crop production

under the diverse environments of soil and climate. We now recognize that past ideas of what constituted adequate fertility must be revised drastically upward if we are to strive for top yields through this combined approach."

**TUESDAY** morning's session opened by an address by Dr. W. I. Myers, Dean of the College of Agriculture at Cornell University, Ithaca, N. Y. Dr. Myers

stated that future farm prices and incomes will depend largely upon the general level of prices, employment and production rather than on agricultural programs.


"No farmer or group of farmers has yet devised a way of increasing farm income by decreasing production," he stated, and emphasized that "we cannot have a prosperous agriculture unless the rest of the economy—our consumers—are prosperous. It is bad

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enough to have income lowered by declining prices, but if both prices and production decline, the national economy is injured and farmers are not helped."

Dr. Myers expressed the opinion that it would be desirable to remove artificial stimulus of guaranteed prices at high levels with accompanying rigid governmental controls of production and marketing. The latter, he contends, are not the solution of the problem of farm readjustment. "Farmers need freedom to shift production to meet consumer demands. There should also be freedom to permit production of various crops to shift to the best adapted regions and most efficient farms and this is prevented by government controls. Flexible support prices, as provided by present law for 1950, are desirable as insurance against severe losses, but they are not a substitute for high demands from consumers employed at good wages."

During the present deflationary period Dean Myers recommended cautious, conservative operation as the soundest policy. The problem is to get an orderly downward readjustment of prices and costs by agriculture and other business to a basis on which the U. S. economy can move ahead with confidence. He listed efficient, low-cost production as the first important factor in the maintenance of farm income.

Rep. Harold D. Cooley, North Carolina, chairman of the House Agriculture Committee was speaker at the annual APFC banquet held Tuesday evening. Defending farm price supports, Rep. Cooley stated that "no real friend of the farmer has advocated or will advocate high price supports of unlimited production of any agricultural commodity" and described the present farm program as "an incentive to produce the abundance demanded under an economy emphasizing an increasingly higher standard of living."

"The current price support pro-

gram is not the result of greed on the part of the farmer and it was not provided in the interest of the farmer alone," he said. "The program, to be sure, is a protection to the farmer and a great benefit to him, yet at the same time it provides an incentive to produce an abundance which otherwise might not be produced. No official of the Government has a right to invoke a program of scarcity. Farm-

ers and consumers alike will insist upon a sound farming economy geared to an economy of abundance."

Rep. Cooley, further defending the Nation's agricultural price support policies emphasized that "the farm price program puts a limited floor under the price of farm commodities just as the minimum wage puts a floor under the wages of labor."

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# Industry Patents

2,468,592. INSECTICIDAL COMPOSITION CONTAINING CHLOROALIMINES. Patent issued April 26, 1949, to Stephen C. Dorman, Berkeley, Calif., assignor to Shell Development Co., San Francisco. An insecticidal composition comprising a carrier and an N-substituted chloral imine toxic agent having the general formula



R<sub>1</sub>

wherein R<sub>1</sub> is selected from the group consisting of hydrogen, lower alkyl and substituted lower alkyl radicals, and R<sub>2</sub> represents a radical chosen from the group consisting of aliphatic hydrocarbon, aromatic hydrocarbon, alicarboeyelic and heterocyclic radicals.

2,468,329. METHOD FOR TREATMENT OF SOILS FOR AGRICULTURAL PURPOSES. Patent issued April 26, 1949, to Charles G. Haycock, Shafter, Calif., assignor to Union Oil Co. of California, Los Angeles. A method for improving the soil for agricultural purposes which comprises applying thereto spent sulfuric acid containing a minor proportion greater than about 2 percent of organic material, in an amount between about 5 pounds and 300 pounds per square rod.

2,470,529. PESTICIDAL COMPOSITION OF POLYETHYLENE POLYSULFIDE AND NICOTINE SULFATE. Patent issued to W. D. Stewart, Yonkers, N. Y., assignor to the B. F. Goodrich Co., New York. A composition capable of protecting plant life from destruction by fungi and insects comprising an aqueous dispersion containing a polymeric ethylene polysulfide having a polymer particle size of 1 to 3 microns and having a sulfur content of 80 to 85 percent, and nicotine sulfate.

2,471,265. PARASITICIDAL COMPOSITIONS COMPRISING ALKYL-HALO-NAPHTHALENES. Patent issued May 24, 1949, to Robert R. Dreisbach and Fred W. Fletcher, Midland, Michigan, assignors to the Dow Chemical Co., Midland. An insecticidal composition comprising an alkyl-halo-naphthalene and pyrethrin as active toxicants.

2,471,575. PROCESS OF PREPARING 2,4-DICHLOROPHENOXYACETIC ACID. Patent issued May 31, 1949, to Richard H. F. Manske, Guelph, Ontario, Canada, assignor to U. S. Rubber Co., New York. A process of preparing 2,4-dichlorophenoxyacetic acid which comprises introducing elemental chlorine into phenoxyacetic acid while maintaining the phenoxyacetic acid and the resulting reaction mixture in the molten state and in the absence of a solvent until substantially two atoms of chlorine per molecule of phenoxyacetic acid originally present have entered into the phenoxyacetic acid molecule by substitution.

## TRADE MARK APPLICATIONS

BOLIDEN, in capital letters, with the first letter surrounded by circular ornament, for wood preservatives, insecticides, fungicides. Filed July 30, 1947,

by Bolidens Gruvaktiebolag, Skelleftehamn, Sweden. Claims ownership of Swedish registration dated Dec. 13, 1946.

BLACK LEAF MOSQUITO-FUMER, white letters hand-inscribed on black leaf background. For parasiticide, namely: smoke aerosols including tobacco extracts and nicotine compounds and DDT. Filed Jan. 27, 1948, by Tobacco By-Products & Chemical Corp., Richmond, Va. Claims use since May, 1947.

BIOLITE, in sans serif capital letters, for chemical toxicants for use in making or formulating agricultural insecticides, fungicides and herbicides. Filed May 26, 1948, by Monsanto Chemical Co., St. Louis, Mo. Claims use since May 5, 1948.

MITOSAN, in sans serif capital letters for chemical toxicants for making or formulating agricultural insecticides, fungicides and herbicides. Filed May 26, 1948, by Monsanto Chemical Co., St. Louis, Mo. Claims use since May 5, 1948.

RANDOX, in sans serif capital letters, for chemical toxicants for use in making, or formulating agricultural insecticides, fungicides and herbicides. Filed May 26, 1948, by Monsanto Chemical Co., St. Louis, Mo. Claims use since May 5, 1948.

PARA-SCALEIDE, in heavy sans serif capital letters, for concentrate in liquid form for the control of peach tree borer. Filed Jan. 26, 1948, by B. G. Pratt Co., Hackensack, N. J. Claims use since Sept. 30, 1936.

CIRCULAR DESIGN, symbolizing crossed torches, for chemical wood preservatives, insecticides, fungicides and bismuth salts. Filed July 30, 1947, by Bolidens Gruvaktiebolag, Skelleftehamn, Sweden. Claims ownership of Swedish registration dated March 8, 1946.

ETIMOLOS, in hand-drawn box with shaded lines extending to edges from center. For insecticides, weedicides, and bactericides for application to and the protection of plants, trees and timber. Filed Jan. 28, 1948, by Nathalie Von Dezen, Paris, France. Claims ownership of French Registration dated May 1, 1930.

ALLPHOS, in stencil capital letters, for parasiticide, namely, insecticides, fungicides and herbicides. Filed Feb. 24, 1948, by California Spray Chemical Corp., Richmond, Calif. Claims use since Jan. 9, 1948.

HIGAM, in Chelt. Capital letters, for agricultural insecticides used on field crops and active ingredients and concentrates sold for formulation of such insecticides. Filed Apr. 10, 1948, by Pennsylvania Salt Mfg. Co., Philadelphia, Pa. Claims use since Nov. 7, 1947.

RESIPROOFER, in hand-lettered Roman capitals, for insecticide. Filed Apr. 20, 1948, by Residex Corp., Newark, N. J. Claims use since Jan. 29, 1948.

PURE, in capital letters within saw-tooth-edged circle, for insect spray. Filed

Aug. 17, 1948, by Pure Oil Co., Chicago, Ill. Claims use since Apr. 1, 1937.

MINERALITE, in hand-lettered script, for fertilizer composition. Filed July 12, 1948, by Edwin G. Leonard, Great Neck, N. Y. Claims use since Oct. 15, 1946.

PHD, in heavy capital letters, for specially prepared hydrated lime for insecticidal use. Filed May 29, 1948, by Warner Co., Philadelphia. Claims use since April, 1945.

BYCOLIFE, in sans serif capital letters, for fertilizer, and more especially for a fertilizer containing an insecticide. Filed Aug. 2, 1948, by Bycolife Fertilizer Manufacturing Co., Clinton, S. C. Claims use since July 2, 1938.

OVAL EMBLEM OF ANCIENT SAILING VESSEL, for fertilizers. Filed Aug. 20, 1948, by Norsk Hydro-Elektrisk Kvalstofaktieselskab, Oslo, Norway. Claims use since July 13, 1923.

CARIBEE, in italic capital letters, for fertilizers. Filed Sept. 3, 1948, by International Minerals and Chemical Corp., Chicago, Ill. Claims use since Feb. 17, 1927.

ORTHOPHOS, in stencil-type capital letters, for parasiticide, namely, insecticides, fungicides and herbicides. Filed Feb. 24, 1948, by California Spray-Chemical Corp., Richmond, Calif. Claims use since Jan. 9, 1948.

PERSISTOPHOS, in stencil-type capital letters, for parasiticide, namely, insecticides, fungicides and herbicides. Filed Feb. 24, 1948, by California Spray-Chemical Corp., Richmond, Calif. Claims use since Jan. 9, 1948.

SPONGE-AWAY, in italic capital letters, for animal insecticides. Filed Sept. 3, 1948, by William Cooper & Nephews, Inc., Chicago, Ill. Claims use since July 13, 1941.

SIGNODE, in sans serif capital letters, for load retaining doors and strips, consisting respectively of sheets and strips of paper or other suitable material, preferably reinforced with metallic strapping, for bridging across the doorways or cargo spaces of freight carriers, such as railway box cars, to contain loads of merchandise within such carriers. Filed Feb. 5, 1948, by Signode Steel Trapping Co., Chicago, Ill. Claims use since Aug. 1, 1947.

SORBIT, in Gothic capital letters, for wetting agent for wetting out and dispersing sulfur. Filed Jan. 14, 1948, by Alrose Chemical Co., Cranston, R. I. Claims use since October, 1932.

CERT-O-CIDE, in Cooper capital letters, for grain fumigant. Filed Sept. 27, 1948, by Cook Chemical Co., Kansas City, Mo. Claims use since July 29, 1942.

HAMPDEN, in script, for ammonium sulfate, paradichlorobenzene, zinc sulfate and sulfur. Filed Sept. 5, 1947, by Hampden Color and Chemical Co., Springfield, Mass. Claims use since 1904.

VELO, in hand-lettered script, for rodenticides and insecticides. Filed Oct. 22, 1947, by Velodent Products Mfg. Co., Inc., New York. Claims use since Oct. 14, 1947.

CALOL, in stencil capital letters, for insecticidal carriers and solvents. Filed Aug. 7, 1948, by Standard Oil Co. of California, San Francisco. Claims use since April, 1948.

### Sabadilla Label Changes

Manufacturers of insecticides containing ground Sabadilla seed have been advised by the Insecticide Division, Production and Marketing Administration of the U. S. Department of Agriculture, that new active ingredient statements must be made with this type of product. In declaring the active ingredients in insecticides consisting of, or containing, Sabadilla seed or "Activated" Sabadilla seed, the active ingredients

must be declared as "Alkaloids of Sabadilla" in order to comply with the terms of the Federal Insecticide, Fungicide and Rodenticide Act of 1947.

The ingredient statement should be in the form:

<b>ACTIVE INGREDIENTS</b>	
Alkaloids of Sabadilla .....	—%
<b>INERT INGREDIENTS</b>	
Total .....	—%
	100%



## for WEED KILLING

The TEEJET is America's most accurately machined spray nozzle. That's why you can depend on it for perfect distribution at all capacities and pressures, even down to 2 gallons per acre. May be used with spray rigs or hand sprayers. Interchangeable orifice tips for WEED KILLING and all other farm spraying needs. Send for details... ask for Bulletin 55.



SPRAYING SYSTEMS  
TEEJET SPRAY NOZZLES  
AVAILABLE FOR EITHER  
FEMALE OR MALE PIPE  
CONNECTIONS



### SPRAYING SYSTEMS COMPANY

3230 RANDOLPH STREET, BELLWOOD, ILLINOIS

Suburb of Chicago

**SELECT TEEJET SPRAY NOZZLES FOR WEED KILLING  
AND ALL OTHER FARM SPRAYING NEEDS**

A manufacturer may, if he desires, add a supplemental statement giving the percentage of Sabadilla seed, or "Activated Sabadilla seed," contained in the product.

Because this is a new requirement and the labels of many products already registered declare the active ingredients as "Sabadilla Seed" or "Sabadilla Seed (Activated)", the Department is said to be permitting the use of such labels for a reasonable time, and is not requiring the immediate discontinuance of their shipment. However, the labels should be revised to comply with the new ruling and put into use not later than for next season's business.

### NAIDM MEETING

*Continued from page 57*

flaked from walls produced the conclusion, he continued, that "Inhalation is of no significance in contaminating milk." Other tests also showed that contamination of milk from the operator of the spray rig is not possible. There will, however, be no relaxation of the recommendation that methoxychlor be substituted for DDT in spraying dairy barns. Dr. Knippling emphasized.

Dr. S. A. Rohwer, in his discussion of control of household pests, asserted that there is need for re-evaluation of some methods in use for applying insecticides, such as mist blowers, fog generators, gas propelled and heat generated aerosols. "We have gotten to think they can be used with impunity," he said, "and this has had a bearing on the general public reaction to promiscuous use of insecticides."

One important thing the chlorinated hydrocarbons have contributed to agricultural and household pest control, he said, is the residual deposits. But fine dispersion, he claimed, is not the way to deposit lasting residues, since the material settles only on level surfaces and does not rest on ceilings or vertical walls.

AGRICULTURAL CHEMICALS

# Classified Advertising

## POSITIONS OPEN

**Young Man:** Large Eastern chemical concern requires young man with well rounded background in agricultural chemicals to conduct market surveys, product development and experimental sales. Technical training as well as commercial ability important. Please send resume of academic and industrial experience, giving age and references. Address Box 361 care of Agricultural Chemicals.

**Entomologist-Biologist:** Biologist, with entomology, plant pathology, or horticultural background to participate in team conducting product development, market surveys, and field evaluation on agricultural chemicals. Considerable scope and challenge for man with interest in economic aspects of insecticides, fungicides, and herbicides. Ability to plan program, obtain grower cooperation and contact Station investigators is highly essential. Prefer man under 35 years. Please state age, education, experience, and references. Address Box 362, care of Agricultural Chemicals.

**Wanted:** Entomologist or Plant Pathologist as national field man. Home office New York. New company, well fixed financially and patent-wise on improved agricultural chemicals. Above normal remuneration for good man. Send resume to D. Frees, 230 Park Ave., New York.

## POSITIONS WANTED

**Agricultural Chemical Salesman:** With B.S. degree in agriculture desires to represent suppliers of agricultural chemicals and allied products as a manufacturer's agent in New York area. Excellent following among distributors, dealers, compounders, and growers resulting in guaranteed large volume sales. Address Box 363 care of Agricultural Chemicals.

**Chemist:** Ph.D., with many years of experience in fields of insecticides, herbicides, disinfectants, soaps, waxes and other sanitary chemicals, desires position. Address Box 365 care of Agricultural Chemicals.

**Chemical Sales:** Salesman with seven years of experience in agricultural chemicals calling on dealers, mixers, etc. desires new connection preferably in charge of branch office for manufacturer. Excellent sales record, covered all states east of Mississippi. For further details, communicate Box 364, care of Agricultural Chemicals.

**Salesman.** Chemical and Pharmaceutical technical background. Twelve years selling experience to industry and consumer, including: fungicides, bactericides, preservatives, detergents and sanitary chemicals. Executive experience in sales promotion, product and market development. Address Box 367, care of Agricultural Chemicals.

## MISCELLANEOUS

**Sales Representation**—Established sales office on Pacific Coast with long experience in insecticides, fungicides, and other specialties for agriculture in position to handle non-competitive chemical line for coast territory. Please specify products, manufacturing point. Finest references and contacts. Address Box 366, care of Agricultural Chemicals.

### ALVIN J. COX, Ph.D. Chemical Engineer and Chemist

(Formerly Director of Science, Government of the Philippine Islands. Retired Chief, Bureau of Chemistry, State of California. Department of Agriculture.)

#### ADVISER ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS

Consultant in reference to spray injury and damage, claims, including imports of fruits and nuts, formulas, labeling, advertising and compliance with law.

1118 Emerson Street  
Palo Alto, California

## CONSULTING ENTOMOLOGIST

Insecticides—Formulation  
Plant Pathology—Research  
Entomology—Legal Service

Author of  
"Chemistry & Uses of Insecticides"

**DR. E. R. de ONG**

926 Stannage Ave., Albany 6, Calif.

### Groggins is Honored

Philip H. Groggins, technician in the Bureau of Agricultural and Industrial Chemistry, was installed as president of the Chemical Engineers Club of Washington, D. C. on June 20. During the late war, Mr. Groggins was chief of the Chemicals and Fertilizers branch of the War Food Admin.

### Correction Noted

In a news item appearing in our June issue regarding new products being offered by Pacific Coast Borax Co., the location of the company's plants were incorrectly listed. The item should have stated that principal offices of the company are at Los Angeles, Chicago and New York city, with resident representatives in other cities.

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(The Advertisers' Index has been carefully checked but no responsibility can be assumed for any omission.)



"Go ahead, Cutbert, he can't hurt us!"

## Backed Up!

**A**DVERTISING can do more than arouse interest in your products before the salesman gets there. It can follow-up and back-up your sales efforts after your salesman has made his call. The old "one-two" punch! Well-placed advertising is the best support which any firm can give its sales department,—the best "backer-upper" in the modern science of selling.

In the sale of products to industry, industrial publications are the logical choice to back-up the efforts of any sales department. For example, in selling the field of chemicals for agriculture, you can put over the old "one-two" advertising sales punch direct and at minimum cost through the pages of

## AGRICULTURAL CHEMICALS

254 W. 31st St.

New York 1, N. Y.

## TALE ENDS

**T**HE "world's largest" manure pile . . . covering 12 acres and ranging in depth from 20 to 35 feet, is located at the Sioux City, Iowa stockyards. Estimated value of the 40-year accumulation of dung is some \$10,000,000; the figure being set by Iowa State College agronomists. The pile is being diminished at the rate of some 300 truckloads a day, by farmers who bring livestock to market and return home with loads of fertilizer. Even at the rate of 35,000 truckloads a year, it will require several years to cart away the estimated 2,000,000 tons of manure.

The story of an eager entomologist in England who "borrowed" some 5,141 insect specimens from a South Kensington Natural History Museum, is told in a recent issue of *Time*. The 26-year old entomologist, E. F. Gilmour, touched off an investigation when he wrote an article for the Royal Entomological Society's *Journal* on *Tmc-sisternus laterimaculatus*, in which he boasted that the beetle was "unique in my own collection". The museum, believing that the only such specimen was in its collection, discovered that the bug was missing.

Scotland Yard found over 5,000 missing insects at Gilmour's home. A magistrate, finding him guilty of selling 16 museum specimens to other collectors, gave the entomologist the opportunity to study roaches in the local jail for three months.

One of the most appreciated features of the recent meeting of the National Fertilizer Association was the maintenance of a definite time schedule during the speaking sessions. Chairman Ray L. King did a commendable job of holding the meeting under control, and the session was adjourned a few minutes ahead of time each day.

AGRICULTURAL CHEMICALS

*Oops!*



*It's Spilling*

THE NEWS ABOUT  
**METHOXYCHLOR "25E"**

*In The Emulsifiable Form!*  
(A FIRST)

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**GEIGY**

The New Virtually [Non - Toxic] Dairy Barn Spray

Geigy's Research Offers  
Another Product Of Its Vision,  
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The Best In Agricultural Chemicals

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**METHOXYCHLOR 50**

(THE WETTABLE POWDER OR DUST BASE CONTAINING  
50% OF THE METHOXY ANALOG OF DDT)



A Leading Name In the Annals of Chemistry for 185 Years

**"ORIGINATORS OF DDT INSECTICIDES"**

WRITE FOR LITERATURE  
DEALER AND DISTRIBUTOR INQUIRIES INVITED



# POTATOES PREFER "PARZATE"



**Potato growers** used to count themselves lucky if their crop escaped blight. Early potatoes, early blight. Late potatoes, late blight, and sometimes early blight too. To add to the problem, many of the chemicals applied to prevent blight often cut yields almost as much as the blight fungus itself.

But today the potato grower has a far better preventive for potato blights . . . Du Pont "Parzate" fungicide. "Parzate" controls both early and late blight, along with other fungous diseases of potatoes. And it is equally effective against diseases of tomatoes,

celery, cucurbits, eggplant, beans and the like.

Even better, "Parzate" appears to improve crop foliage. In fact, users report healthier, thriftier plants which result in amazingly improved yields.

\* \* \*

*"PARZATE" is just one of many outstanding products of Du Pont research. You can get full information on this and other Du Pont farm chemicals from your local Du Pont technical representative. Or write to Du Pont, Grasselli Chemicals Dept., Wilmington 98, Delaware.*



REG. U. S. PAT. OFF.

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... THROUGH CHEMISTRY

#### DU PONT CHEMICALS FOR THE FARM INCLUDE:

Fungicides: PARZATE\* (Liquid and Dry), FERMATE\*, ZERLATE\*, Copper-A (Fixed Copper), SULFORON\* and SULFORON\*-X Wettable Sulfurs—Insecticides: DEBNATE\* DDT, MARLATE\* (Methoxychlor), LEXONE\* (Benzene Hexachloride), KRENITE\* Dinitro Spray—Weed Killers: AMMATE\*, 2,4-D, TCA and Dinitro Weed Killers—Also: Du Pont Cotton Dusts, Du Pont Spreader Sticker, PARMONE\* Fruit Drop Inhibitor and many others.

\*REG. U. S. PAT. OFF.

[ On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully. ]